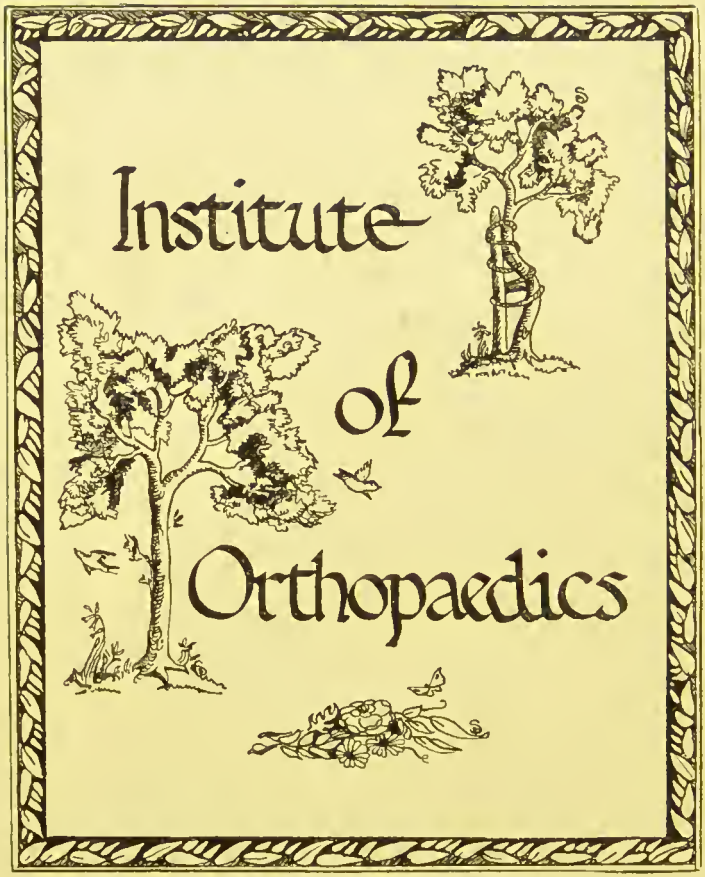

THE

DISEASES AND INJURIES

OF

THE JOINTS.

ON THE

DISEASES AND INJURIES

OF

THE JOINTS.

CLINICAL AND PATHOLOGICAL OBSERVATIONS.

BY

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PREFACE.

The following work is now submitted to my professional brethren as a contribution to the clinical surgery of the diseases and injuries of the joints.

It is not to be regarded as a complete treatise upon these important and interesting subjects, but simply as the record of much personal investigation, and of some experience.

The consideration of the diseases of the joints has been based upon pathological inquiries, which have extended over a period of some years; and the injuries of the joints are illustrated by cases which have, with but few exceptions, passed under my own observation.

The labours of my predecessors have not been disregarded; and if their names have been left unmentioned, it is not from the want of a due appreciation of their merits, but from the idea that

the record of personal experience is generally the most valued, and that by the adoption of another course these pages would have been indefinitely extended.

A portion of the material here printed has been already published in the periodicals of the day; but it is hoped that the interest of the whole has not been thereby diminished, and that the intentions of the author may not prove unsuccessful.

To the student and practitioner it is believed that this work will be of value as a guide to their clinical practice, and the shortcomings of the present volume will probably be corrected at some future period.

Wellington Street, London Bridge;
September, 1859.

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PART I.

DISEASES OF THE JOINTS.

DISEASES

OF

THE SYNOVIAL MEMBRANE.

CHAPTER I.

SYNOVITIS.

Synovitis, or inflammation of the serous capsule of the joints, may be divided into four sections: the Acute, Subacute, Chronic, and Rheumatic. It is found as frequently in males as in females; it may occur at any age, although it is somewhat rare before puberty, but in adult life it is the common form of diseased joint. It may be the result of a wound, a blow, a strain, or any injury; or it may be merely a symptom of a more general disease, such as gout, rheumatism, syphilis, gonorrhœa, or pyæmia. It may occur both in the healthy and in the cachectic subject, and its character is always modified by the constitutional tendency, whether strumous, syphilitic, or rheumatic

It may be produced by the extension of disease from the bones, or from the cellular tissue external to the joint, and the most violent and destructive form is that which follows the discharge of an abscess into the articulation. No joint is free from its attack. When the result of an accident, all are equally liable to become inflamed; but when taking place without any known cause, the superficial joints are generally involved, and of these the knee is by far the most favorite locality.

The subjoined analysis of cases from my note-book will demonstrate many of these points.

Amongst 194 cases, 98 were in males and 96 in females.

Age.	Acute.	Sub-acute.	Chronic.	Rheumatic.	Total.
Under 11 years of age	1	7	3	2	13
From 11 to 20 „	7	28	4	10	49
„ 21 to 30 „	9	30	13	17	69
„ 31 to 40 „	5	23	3	5	36
„ 41 to 50 „	2	8	1	2	13
„ 51 to 60 „	1	1	5	4	11
„ 61 to 70 „	—	3	—	—	3
Total . . .	25	100	29	40	194

The Seat of the Disease.	Acute.	Sub-acute.	Chronic.	Rheumatic.	Total.
Hip . . .	2	—	—	1	3
Knee . . .	19	76	25	32	152
Ankle and foot . .	—	10	3	3	16
Shoulder . . .	1	2	—	1	4
Elbow . . .	1	5	—	1	7
Wrist . . .	2	7	1	2	12
	25	100	29	40	194

From the above analysis it appears that males are equally liable to synovitis with females.

That early adult life is the age at which it most frequently appears.

That the subacute form is the most common; and—

That the knee is by far the most favoured locality, about 77 per cent. of all cases attacking this articulation.

Section I.

Acute Synovitis.

Acute synovitis, as the result of a wound, will be treated of in another chapter, and we will now proceed to the consideration of the same subject as produced by other causes. It may take place in any joint as the result of an injury, but it may occasion-

ally occur without any evident cause; it may be the result of an abscess discharging into the joint, or merely a symptom of a more general disease, such as pyæmia.

In all these cases, with the exception of the second form, or the idiopathic, the destruction of the joint is too frequently the rule, and the disease from its commencement is rapid in its progress, severe in its symptoms, and, when attacking the large joints, too often fatal in its results.

When it takes place as the consequence of a blow, but slight pain or inconvenience may be the immediate result of the injury; the patient may walk about, or move the joint without much pain, but in the course of a few hours, or a few days, acute symptoms will make their appearance. Severe local pain will be first felt, and complete inability to use the joint; any attempt to move, or to examine the part, will considerably aggravate the symptoms, and the joint will, as a rule, be found in a partially flexed position. Effusion rapidly takes place, distending the synovial sac; and this can be easily recognised by its bulging out from between the bones. The constitutional symptoms will proportionately be severe, all those characteristic of fever will be present; the hot and dry skin, flushed face, dry and furred tongue, and the quick and hard pulse; the patient will regard with horror any attempt or offer to examine the part, and any hint of movement gives rise to symptoms of apprehension. In but a

few days, as the disease progresses, symptoms of suppuration make their appearance, as indicated by rigors, and depressed powers; the joint will be still swollen, and, perhaps, to a greater extent, but the integuments and parts around will evidently have become involved; the skin will generally be inflamed, and somewhat fixed, and but a few hours may elapse before actual pointing will be visible; profuse and acute suppuration then follows, and the patient—already brought down by pain and the severity of the symptoms—rapidly sinks, worn out by hectic.

The above is a brief sketch of the progress of a case of acute synovitis, when the result of an injury, and unchecked by treatment; when it follows the discharge of an abscess into the joint, or pyæmia, its progress is more rapid, and its result more fatal, the destruction of the articulation being a necessary consequence. When, however, acute synovitis arises spontaneously, without any known cause, its progress is somewhat similar, although, perhaps, it is less rapid; the symptoms appear in the same order, and with various degrees of severity, but it is rare for acute suppuration of the joint to take place. When attacking strumous or cachectic patients, this result may occasionally ensue, but, as a rule, it may be stated that this form of the disease—the idiopathic—is very amenable to treatment, and that destruction of the joint, and the death of the patient, is exceptional.

The following brief outline of cases, selected from my note-book, will illustrate the subject:

Case 1.—*Acute synovitis, the result of injury.*—John R—, æt. 15, received a kick upon the right hip two weeks before his admission into Guy's Hospital; he felt but little pain after the accident, but the following day it became very acute; this rapidly increased, accompanied by severe constitutional symptoms, with flexion of the joint, and inability to move the limb in the slightest degree. When admitted, there was considerable enlargement of the articulation; the limb was flexed upon the pelvis and rotated inwards, and there were evident symptoms of suppuration; the powers of the patient were also very feeble. A few days after admission, or about the twentieth day after the accident, the abscess was opened, and profuse discharge ensued; the operation afforded much relief, but ten days afterwards he sank, worn out by hectic.

Upon examining the joint, the head of the femur, the acetabulum, and nearly the whole of the right os innominatum were stripped of their periosteum and cartilage; the pubic bones were separated at their lines of junction, were black, and bathed with pus; the cartilage had almost entirely disappeared, one spot only remaining, and this, microscopically, presented the last stage of the granular degeneration.

The next case is one produced by the discharge of an abscess into the articulation.

Case 2.—Thomas G—, æt. 33, six weeks before his admission first complained of pain over the head of the tibia; he continued, however, at his work for one week, when he was obliged to desist on account of the excess of pain. He sought advice, but failed to obtain any relief, and consequently came to Guy's. When admitted there was, evidently, an abscess beneath the fascia over the head of the tibia, which was opened, with immense relief to the patient.

Everything progressed well for three weeks, when acute pain suddenly appeared in the joint, followed by its rapid enlargement from effusion within. Leeches were freely applied, and fomentation, without much benefit, affording only temporary relief; and upon the seventh day, the joints being much distended, and the pain great, a puncture was made into and upon each side of the joint, giving exit to abundance of fœtid pus. This operation was followed by comparative ease, but profuse suppuration appeared to act so injuriously upon the powers of the patient, that, after two weeks had expired, amputation was performed; some secondary hæmorrhage took place; and rigors, with vomiting, followed; and, upon the tenth day, the man sank from pyæmia.

Upon examining the joint, the synovial membrane was much injected, soft, and flocculent; the cartilages were in parts destroyed, exposing the bone, and in others it had undergone the granular degeneration.

The fibro-cartilages were loose, and hanging only by shreds of membrane. The bones were healthy. The external abscess had evidently made its way into the joint by a sinus passing upwards beneath the inner semi-lunar cartilage. The lungs were healthy, and the liver was studded with small pyæmic abscesses. The other viscera were healthy.

The two preceding cases are good illustrations of acute synovitis as the result of an injury and the discharge of an abscess into the joint; and I will now proceed to make some few remarks upon that form of the disease which destroys so many of our surgical patients, and which may be found whenever suppuration, however slight, exists, and is called pyæmia. We find it in puerperal women, as well as in all surgical cases; it may follow upon the mere application of a seton, it may be associated with a simple pustule; it is found after any of the injuries to which man is liable, and especially after surgical operations. It is a very common consequence of operations upon the urinary organs, and destroys ten per cent. of all amputations. It is most rapid in its course, and fatal in its effects, destroying generally by involving some of the viscera, as the lungs or liver.

The following case will, perhaps, well illustrate the disease:

Case 3.—Henry H—, a railway porter, æt. 56,

was admitted into Guy's Hospital under the eare of Mr. Birkett, after having reeeived a eontusion of the right knee, and severe eeehymosis of the leg, from the passage of a eart wheel over the limb. By rest and eold applieations, all effusion disappeared, and he left his bed, and walked in the grounds of the hospital. Upon the twenty-sixth day after the aeeident he was suddenly seized with severe rigors, pain appeared in the right knee-joint, and the leg began to swell; this pain in the joint beeame most aeute, and the synovial sae was evidently severely distended; upon the seeond day, as marked symptoms of suppuration were present, the joint was opened, and mueh pus eseaped. Typhoid symptoms, however, appeared, and upon the fourth day from the first appearanee of the disease he died.

Upon examining the leg the parts around the joint were infiltrated with serum. The synovial membrane presented a beautiful, injeeted, velvety appearanee, being eovered with long fimbriated fringes of lymph. The joint eontained pus and synovial fluid. The cartilages and bones were entire. There were no signs of extreme suppuration, or eommunieation with the joint. The veins were also normal. The lungs were healthy, liver fatty, and the kidneys eontained fat and granular matter, and the whole surfaee of their cortieal structure was eovered with red points of extravasated blood — the earliest pathologieal symptom of purulent infiltration.

Numerous other cases might be given to illustrate this subject, but it is hardly necessary; some may be as rapid in their course as the example just quoted, others of longer duration, and going on to destroy both the joints and other organs. When of a slower progress, the earliest symptom may be regarded as rheumatic, and the cautious practitioner should be on his guard when such cases are ushered in by rigors, however feeble.

Subacute Synovitis.

Subacute synovitis now claims our attention; it is by far the most common form which comes under the notice of the surgeon; it is as frequently the result of general causes, as of injury; its symptoms, although well marked, are not severe; the progress of the disease is far less acute than of that previously given, and, as a rule, a good recovery may confidently be expected. It may be found in any joint, and as a result of any cause, excepting the discharge of an abscess into the articulation, or pyæmia, which invariably produce acute disease.

It commences by a sense of weakness, and with wandering pains in the joint; after a few days the synovial sac will become distended, and in joints well situated for inspection, the bulging character of the enlargement between the bones will clearly point out its character. There will generally, at this time, be some sharp pain, aggravated by ma-

nipulation or movement, and the joint will be found in a semiflexed position. Constitutional symptoms also will be present; the skin will be hotter than natural, and the pulse quicker; the secretions will also generally be found more or less abnormal. If not checked by treatment this disease will frequently pass into a passive or chronic condition, and will then be more difficult to cure, although it may merely prove a source of anxiety and vexation by the mechanical inconvenience of the enlargement. In strumous and cachectic subjects a different result may ensue; the disease may gradually spread to other tissues, and involve the cellular tissues external to the joint, the cartilages within, or both, and a more serious result may then be anticipated; but in the majority of instances this is not the case, and a bad recovery is the exception.

Chronic Synovitis.

In acute synovitis, we have already remarked that the symptoms appear rapidly after the application of the cause, or after their first appearance; they are locally and constitutionally of a severe character, and too frequently terminate in the destruction of the joint, if not in the death of the patient.

In the subacute form of the disease, we have shown that this is not the case; that the local symptoms, although well marked, are much less severe; that the constitutional, likewise, are consi-

derably less acute; that the joint, as a rule, preserves its integrity; and that, by treatment, the articulation may generally be restored to its normal condition.

We now proceed to consider the chronic form of synovitis, as one marked by still less severity of symptoms, both locally and constitutionally; and, although the disease does not tend to involve other tissues to the destruction of the joint, or ordinarily even to any change in the synovial membrane itself, it is not so amenable to treatment, or so satisfactory in its result as the former division.

It may be the sequence of the previous subacute form, or it may originate by itself; the symptoms are unmarked by any constitutional disturbance, the mere mechanical enlargement of the joint being the chief symptom; the synovial membrane gradually pours out its excess of secretion, as gradually causing dilatation of the sac, and producing a corresponding expansion of the joint; it may progress to an enormous extent, cause relaxation of all the ligaments, and even dislocation, and, as a consequence, it is attended with great weakness of the articulation, and the deprivation of the use of the member.

Vague wandering pains may occasionally be present, but they are very slight, and may not be mentioned unless inquired for.

Rheumatic Synovitis.

This form of inflammation of the synovial membrane is separated from the preceding, as it is the local manifestation merely of a more general cause; it may, undoubtedly, be set up by an injury, however slight, but merely sufficient to cause the general rheumatic tendency to develope itself. All the forms of synovitis which I have already described, may truly be more or less influenced by the rheumatic diathesis, in patients where such a tendency may exist; but as a separate class of cases it is not uncommon, and consequently deserves a separate consideration.

It may be seen as acute, subacute, or chronic; in its acute form it is denominated rheumatic fever, and, as such, comes more under the notice of the physician. As surgeons, it is generally presented to our notice as a local disease, perhaps following an acute attack, or commencing as a chronic disease, without any distinct cause. This is not the place to touch upon those later cases of anchylosis, either true or false, which are evidently the result of this disease; and it is only my intention to base the few remarks I am about to make upon those forms marked by effusion into the synovial sac. The appearance of the symptoms is not unlike those previously given in simple chronic and subacute forms.

The joint enlarges with variable rapidity, and with symptoms, both local and constitutional, depending upon such; but the chief diagnostic symptoms are those which indicate the gouty or rheumatic diathesis. If looked for, there will generally be found some tendency to gout or rheumatism; there may have been an acute attack some short time previously; or, perhaps there may be no history of the kind, vague wandering pains about the body alone indicating this rheumatic tendency; the urine will, as a rule, be loaded with lithates; the patient will complain of great acidity of the stomach; the secretions of the skin will present those peculiar acid properties which are so easily recognised; to the hand it will be always clammy, and at times bathed in perspiration; the articular pains are generally aggravated at night; and the integument over the joint often presents an erythematous blush.

When these symptoms are present, a gouty or rheumatic synovitis may be suspected, and it is important that an accurate diagnosis should be made, as the success in its treatment depends much upon a correct opinion of the character of the disease.

Section II.

Diagnosis.

The diagnosis of synovitis is a task of no difficulty when it is uncomplicated with other affections of the joint, or parts around. In any of its forms, at periods varying according to the severity of the inflammation, the synovial sac soon becomes distended with effused fluid. If the knee-joint is the part involved, the patella will be raised from its position, and the synovial sac around it will protrude between the articular extremity of the bones; if the leg is moderately extended, and the hand placed over the condyles of the femur, upon moderate pressure being made the patella will be gently elevated, and by a slight tap can be made as it were to float in its fluid bed. If the leg is placed in a somewhat dependent position, the fluid will gravitate below, and will consequently protrude upon either side of the patella and its lower ligament. In joints well exposed to observation, the distension of the synovial membrane is the chief physical symptom manifested, and it is not difficult of detection; in the elbow, ankle, wrist, and smaller joints, it will protrude between the bones forming the articulation, and to the hand it will yield a sensation of elasticity, in degrees varying according to the distension. In the hip and shoulder

this distension is not so visible, and the diagnosis must be made more from general symptoms. In the former, the leg will be generally partially flexed upon the pelvis, and rotated inwards,—attempts at movement will produce pain, and if looked for, an inordinate degree of fulness will be observed below the groin, over the insertion of the psoas muscles, or posteriorly behind the greater trochanter; and pressure upon these spots will induce suffering. In the shoulder, the joint may appear, when compared with its fellow, more than naturally round, and firm pressure over any part of it will cause pain; but when the pressure is made anteriorly over the bicipital groove, or posteriorly below the root of the acromion process, a degree of distension will be observed, and pain will be expressed upon manipulation in degrees varying according to the severity of the inflammation.

In the chronic forms of the disease the distension of the joint may be very great, and the diagnosis then becomes very evident; in the knee, the ligaments may be so stretched that the bones may be dislocated in any direction; in the hip, extreme mobility may also be the result of the over-distension of the synovial membrane. This mobility is not to be confounded with dislocation of the articulation, as a result of rupture of the synovial sac from ulceration, or from some chronic disease of the joint; and it is easily distinguished by attention to the history of the case and its symptoms. When

the disease has considerably progressed, perhaps to suppuration, some difficulty may be experienced in forming an opinion; but the history of the case will best assist us, and in the discharge some mixture of the synovial fluid will generally be observed.

Section III.

Prognosis.

The prognosis, in cases of synovitis, varies considerably, according to its different forms.

In acute synovitis, when unchecked by treatment in its early stage, and when suppuration of the joint has taken place, a fatal termination must generally be anticipated if the seat of the disease should be one of the larger joints, as the hip or knee; some successful cases undoubtedly occasionally take place, but they are few and far between, and then often with the loss of the limb. Out of the twenty-five examples of acute synovitis which I have before me, eleven died. In thirteen cases the disease was checked in its early stage, and a good recovery ensued. In six cases, including four of the knee, one of the hip, and one of the shoulder-joint, death rapidly followed upon the suppuration of the articulation, without any operative interference. In three cases, including one of the hip, and two of the knee, the joint was opened by a free incision, to give relief

to the pain, and to evacuate its purulent contents; but a fatal result took place. In three examples, all knee-joints, amputation was performed, and in only one with a favorable termination.

In the subacute, chronic, and rheumatic forms of inflammation, there is little danger to life; in the former a complete recovery may generally be expected, although some pass into a chronic condition, and then become more difficult to cure. In the chronic, much difficulty is often experienced, although the joint generally remains intact. In the rheumatic form a successful result may generally be looked for, although the disease, not being purely a local one, is very liable to recur, and an anchylosed joint may ensue.

Analysis of Cases.

Out of 25	acute	.	.	11	died,	14	cured.
„ 100	subacute	.	.	—	„ 65	„ 35	relieved.
„ 29	chronic	.	.	—	„ 12	„ 17	„
„ 40	rheumatic		.	—	„ 19	„ 21	„
Total 194		.	.	11	110	73	

The fatal cases include 2 of the hip, 8 of the knee, and 1 of the shoulder, this latter and one of the knee taking place after confinement.

Section IV.

Pathology.

Remembering that a synovial membrane has the anatomical characters of a serous sac, which in its normal condition secretes a peculiar viscid fluid, called synovia, it is only what might be expected that the pathological appearances which present themselves in its inflamed state should bear a strong analogy to those seen in other like structures.

It has never been my fortune to examine a joint in the earliest stage of simple inflammation; consequently, I am unable to say positively that an arrest of its natural secretion is its earliest effect. Judging by analogy, we may fairly believe such to be the case, although I know of no positive reported instance. I remember examining a patient who died from pyæmia, in whom many of the principal joints were destroyed in different degrees by purulent inflammation; and in one ankle-joint I found the cartilages perfectly smooth, and also the synovial membrane, but no synovia was present, although there was abundance in other joints. The membrane, however, was by no means more injected than natural; and, although I was then, and am still disposed to regard that condition as the earliest

result of inflammation, it is only stated as a probability, and not as a fact.

The first positive result which presents itself is excess of secretion. In the simplest chronic forms of synovitis this may be the only result, the membrane itself appearing but little altered; in a more severe form the membrane will appear injected, and the synovia, instead of being clear and thin, will be clouded, containing flocculi of lymph. In other cases, and more particularly in the rheumatic form, masses of clear fibrinous material will be thrown out, and deposited within the mucous folds of the joint membrane. In the case of a child which will be mentioned hereafter, with acute inflammation of the hip-joint, a thick sanguinolent purulent material like currant jelly was seen in the articulation; in another instance, a distinct layer of new membrane was poured out within the synovial sac, which could be peeled off.

Case 4.—In a case which has just come under my notice of a boy, æt. 9 years, dying from disease of the lung, associated with inflammation of some of the tarsal joints, the ankle, which had evidently but recently become inflamed, presented a synovial membrane which was most exquisitely injected, films of recent but firm fibrinous material were poured out over the surfaces of the cartilage, and beneath this were fine radiating capillary vessels, proceeding from the margin; in one spot, I carefully raised the

deposit of lymph, leaving the injection as clear as ever; it became evident that these capillaries were not therefore on the new-formed membrane, but existed either in the cartilage or upon a membrane covering it. This latter was undoubtedly the case, and the fact goes, I think, positively to prove the existence of a layer of synovial membrane over the articular cartilage. But this was not all; anxious to make a microscopical examination of the part, I made a thin section through the cartilage, and its vascular covering; the swollen synovial membrane became distinctly visible, covering the cartilage which had undergone the granular form of degeneration, and with care the membrane was separated from its cartilage by means of needles.

This case I am disposed to think of some value, as settling through pathology a question which anatomists have disputed.

In acute cases of synovitis, and in bad subjects when pus is the fluid which has been poured out, the membrane itself generally becomes considerably altered; it will appear in some instances minutely injected, and in others covered with lymph deposits of various degrees of tenacity. In some, as in Case 2, the membrane will be soft, floeculent, and lacerable; in others, it will be ulcerated. In some, it will present a most beautiful fringed, velvety, fimbriated appearance (Case 3); and in some few examples (Case 1), it will have disappeared entirely,

having broken down and degenerated in common with the cartilages, and all other structures with which the pus comes in contact; it is extraordinary in some cases how rapidly this result takes place, the pus apparently acting as a caustic, destroying everything by mere contact.

In what is called scrofulous synovitis, when disorganization of the joint has taken place, the synovial membrane and cartilages will present characteristic features; the former will have lost all its natural appearance, and will be soft, and covered with small flakes of curdy lymph; the heads of the bones will also be covered with the same material, the cartilages having already disappeared; but if this should not be the case, they will be easily removed by the slightest touch. The pathology of the disease, however, is the same as in the previous instances, the material poured out by the inflammatory process being only modified by the constitutional tendency of the patient, and, consequently, being of a lower character.

There is a class of cases not included in the previous divisions of synovitis which have been just described, in which a change of structure takes place in the synovial membrane, and frequently also in the joint; they are important both in their character and results, and will, consequently, receive a chapter to themselves.

Section V.

Treatment.

The activity of our treatment must be adapted to the intensity of the inflammatory action; in acute cases it must be prompt and decided, as the destruction of a joint is rapidly effected, and if purulent secretion is poured out this result must certainly ensue. The instant any symptoms of inflammation show themselves, whether the result of an injury or otherwise, the liberal application of leeches should be employed, to be repeated at intervals, if necessary, and their bleeding encouraged by means of hot poppy fomentations, or a linseed poultice; the limb at the same time being well raised upon pillows in a slightly flexed position.

Salines may at the same time be administered to relieve the fever and constitutional excitement, and in healthy subjects some mercurial given, such as the gray powder in three or four grain doses, combined with an equal quantity of Dover's powder three times a day. In the majority of the successful cases, this treatment was employed, associated with abundance of simple nutritious food. After the acute symptoms have subsided, tonics are of great value, and the gentle support of the joint by strapping affords much comfort, and hastens its return to its natural

condition. In several examples which have passed before my notice, in which acute symptoms of inflammation appeared after an injury to the knee-joint, the constant application of cold by means of irrigation proved a most valuable remedy, not only subduing rapidly the morbid action, but giving speedy relief to the severe local pain and general constitutional excitement. In these instances this was the only local treatment, the limb being raised in a partially flexed position upon pillows. Tonics were subsequently given, and the joint strapped. In weak subjects, particularly, this treatment promises to be of great value. In synovitis, the result of a wound, I know of no treatment equal to it; and in the cases now under consideration there is strong reason to believe that it will prove equally successful. It is hardly necessary to dwell upon the importance of absolute rest, as the intense pain occasioned by any movement ensures this essential point.

In the *subacute* form of synovitis, the same treatment may be employed. The leeching may be less free, and will not require such repetition, but the principles which ought to guide the surgeon are precisely similar, and few cases resist such treatment. The application of blisters should not be forgotten in this or in the former variety; when becoming subacute they are valuable remedies, and should be applied in strips, one upon each side of the joint. The iodide of potassium, combined, perhaps, with tonics, such as the iodide of iron in the

form of syrup is a remedy of great value in some cases, particularly if the syphilitic poison appears to modify the local action; and when there are symptoms of thickening of the synovial membrane, the mercurial ointment applied with strapping is a useful adjunct.

In the *chronic* cases, blistering, the administration of the iodide of potassium, or mercurials in the form of the bichloride combined with tonics, followed by firm pressure upon the joint by strapping with or without mercurial ointment as occasion seems to offer, is the general treatment; good living and rest are important adjuncts, and, although these cases are as a rule obstinate, still, by perseverance, a cure will generally be effected.

There is a form of *synovitis associated with gonorrhœa,* which is most obstinate to treat; I know that some surgeons deny its existence, but I think this is difficult, as there is no doubt they are often found associated together, and it seems probable that they are produced by the same cause. If, however, I had ever been disposed to deny their connexion, the following example which came under my care would tend to convince me of the contrary, and subsequent experience has led me to believe that such a disease exists.

Case 5.—A man, æt. 36, applied to me with subacute synovitis of both knees, associated with a slight gonorrhœa, but the discharge was considerably less than it was before the affection of the joints

appeared. He had had gonorrhœa fifteen times previously, the earliest at sixteen years of age, and at each attack he was laid up with swelling and enlargement of the joints, generally the knee. The man recovered perfectly, and appeared a second time with the same disease, and the same complication. Between the different attacks he was perfectly free from all pain, and he had no tendency to any other rheumatic affections. The iodide of potassium with iron appears to be the most valuable remedy in this disease, and bandaging the joints with flannel; but it is an obstinate one, and, at times, remedies appear to have but little influence; the disease disappearing as the health improves, or else wearing itself out.

In the *gouty* or *rheumatic* forms of synovitis, the disease is to be cured only by remedying the constitutional tendency to develope their specific poisons. When gout is the cause, give alkalies, associated perhaps with colchicum. In the rheumatic form salines, and. if in cachectic subjects, combined with tonics; lemon-juice or the salts of potash being the most useful forms.

The application of a blister to the part, and subsequently pressure by strapping, may be the only local treatment required; in acute cases, warm fomentations, or dry hot applications; and in chronic, the local application of dry sulphur beneath a flannel bandage appears to give relief.

In the chronic condition, where a tendency to fixture of the joint is present, motion must be insisted upon, or else it will become permanent; friction with some stimulating liniment is also a valuable adjuvant.

This rheumatic disease, however, being only a local manifestation of a general cause, can only be successfully treated by remedies which act upon the blood, and thus remove the cause which may excite its development.

In the West Indies it is well known that surgeons are in the habit of tapping a joint when much enlarged from chronic effusion, and bad symptoms seldom result; in this country such a practice is rarely adopted; but in one case which came before me this operation was performed with decided advantage.

Case 6.—It was in a child, aged seven years, who was seized with subacute synovitis of the knee-joint following a fall; the articulation filled rapidly, and from its distension produced severe pain, although the other symptoms were by no means severe. Mr. Cock, under whose care the patient was, drew off, by means of a small trochar and canula, two ounces of a thin, transparent, dirty straw-coloured albuminous fluid, with immense benefit. Recovery rapidly followed, and the child left with a sound limb.

When the joint has suppurated there can be no doubt about the propriety of freely giving exit to its

purulent contents by a liberal incision. This should be made upon the most dependent part of the joint to allow of the pus to drain away, and warm applications should be constantly applied; opium should be given, in quantities sufficient to allay pain and constitutional disturbance, and abundance of wine and nutritious food administered.

Under this treatment, and by preserving the joint in perfect rest at the angle which may be the most useful to the patient, with or without the application of splints, a recovery may ensue. The joint will in all probability be a stiff one, as anchylosis is almost a necessary result of its acute suppuration; the cartilages rapidly degenerating and breaking up in suppurative inflammation of the synovial membrane.

In some instances, the constitutional irritation of a suppurating joint becomes so severe as to threaten the life of the patient, and the question of some operative interference must then be seriously entertained. If the joint be a large one, such as the knee, and amputation is performed, the chances of success are small—but one case out of three terminating successfully; still that success is greater than where the disease is allowed to run its course, as a fatal termination is then generally to be anticipated. In smaller articulations the most successful treatment is to leave the joint alone, as long as there is a free exit for the pus; operations, such as amputation or excision for acute disease, generally proving very unsatisfactory.

CHAPTER II.

THE PULPY AND GELATINIFORM DISEASES OF THE SYNOVIAL MEMBRANE.

Section I.

I have not included in the previous pages any account of those cases "in which the synovial membrane has undergone a morbid change of structure," as they demand, from their peculiar pathological characters, and also from their local effects, a separate consideration.

It is to Sir B. Brodie's scientific sagacity that we are indebted for having separated this class of cases from the ordinary forms of synovial inflammation; and although he recognised the fact, that in neglected or protracted cases of chronic inflammation, the synovial membrane may completely lose its natural structure, becoming highly vascular and much thickened, he nevertheless separated such cases from others in which the synovial membrane "was converted into a brown, pulpy, soft mass, of considerable thickness, intersected by membranous lines."

The wisdom of such a division I am by no means

disposed to dispute, although I believe that many of the cases which are classed amongst the latter really depend upon a chronic inflammatory action.

I propose, therefore, to make a few remarks upon both classes of cases, which may at present be regarded as differing in their pathological characters.

In the discussion of the pathology of synovitis in its different forms, we have already seen that the secretion of the synovial membrane may vary from a simple excess of secretion to a most destructive purulent one. We have seen the membrane itself, instead of presenting a smooth, uninjected, secreting surface, become perfectly red with distended vessels, these vessels, in rare examples, extending over the articular cartilages. In some instances the synovial membrane is ulcerated, in others it is sloughing; in some it may be covered with a beautiful fimbriated fringe of lymph, in others concealed with a distinct layer. In subacute or chronic cases the synovial membrane will become thickened, and a layer of organised inflammatory product may become firmly united to its surface; the disease may rest here, and remain torpid for months or years; a fresh attack of inflammation may then take place, and another layer of organisable material be deposited within the last; and this action may be repeated at uncertain intervals, until the joint itself becomes almost obliterated. I have, however, seen this extreme result but once, and this was in one of the phalangeal joints.

Case 7.—A healthy man, æt. 20, eleven months previously, had wounded his finger; the wound healed, but the joint inflamed. This attack was subdued for a time, but at intervals the part became painful, and when I saw him the joint was exceedingly enlarged, and had a semi-elastic doughy feel; mobility existed, but manipulation or movement caused much pain. I amputated the finger, and upon making a longitudinal section of it, the synovial membrane was seen to be nearly half an inch thick; the inner surfaces were completely in contact, although not adherent, and microscopically this growth presented the ordinary characters of the nucleated fibres.

From the history of this case it was tolerably certain that frequent attacks of inflammatory action had been the cause of the pathological changes which I have just described; the synovial membrane had become thickened, both by interstitial deposit and by the organization of different layers of lymph, and the joint had thus become nearly obliterated.

In other cases I have seen similar changes, although not to such an extreme extent; in some, the synovial membrane has been only thickened; in others, this thickening has been increased by the deposition of a layer of organised lymph, as is seen in other serous membranes. In still older or more advanced cases, I have witnessed this thickening to the extent of an inch or more, and have been

enabled to trace at least three distinct layers of new membrane. In parts, the line of demarcation had become indistinct, and the growth appeared to be of one homogeneous structure.

In advanced cases this new product may break down, and suppurative sinuses thus form, with all the miseries which follow upon suppuration of a joint.

The experience of most surgeons, I believe, will furnish them with examples somewhat similar to those which I have described; and I will now proceed to the consideration of the other form of disease, which is called the pulpy degeneration of the synovial membrane, as originally described by Sir B. Brodie. The two forms of disease are to a certain extent analogous, but still they are unlike, as the symptoms which indicate the presence of the pulpy degeneration are not such as may be called inflammatory; and the change of structure is not precisely of the same character as the preceding.

It is like the former, inasmuch as it essentially depends upon a change of structure in the synovial membrane. This membrane becomes thicker and of a pulpy consistence, the thickness depending upon the duration and rapidity of growth of the disease; in some instances, it will be only to a slight extent, in others, it will measure about one inch in diameter. This growth will be of a light-brown colour, and will contain cells of various sizes, filled with serum either of a straw colour, or tinged with blood; these cells

being divided by bands of tissue of a white colour, and somewhat more firm than the remaining structure.

This growth will most frequently involve the whole of the synovial membrane, gradually encroaching upon the articular cartilages, which in old cases disappear, and suppuration with destruction of the joint ensues.

This termination, however, is not common; the disease is not generally of rapid growth, nor has it a tendency to involve other structures. Microscopically it presents the elements of a fibro-plastic tumour; it consists of nucleated cells and fibres, the white bands being more of a fibrous character; it appears to be developed in the membrane itself, and not upon it. In its structure it is therefore somewhat like the disease we have last described as the gelatiniform, which is evidently the result of an inflammatory action; and may not this also depend upon a similar cause in subjects whose constitutional tendency is to the development of disease of a low type, and in whom all the actions of the body are of a torpid character?

The synovial membrane is stimulated to produce within its structure the simplest elements of all growths, fibro-nucleated tissues, although the action which attends their development is too feeble to give rise to symptoms sufficiently marked to enable us to class it amongst the inflammatory diseases.

It is so unlike all other morbid actions in the body

to see a membrane producing new growths, composed of such simple elements, and not being the result of inflammatory action, that it appears more rational to believe that this pulpy disease is merely the result of the same action, modified by some peculiar constitutional tendency, than that it is essentially a new product of a specific disease.

Section II.

Diagnosis and Symptoms.

In the diagnosis of any disease the symptoms which indicate its first approach are undoubtedly the most important. In advanced cases there certainly may be present some positive and marked appearances or changes which may at once lead the surgeon to form an opinion upon the case before him; but such is not generally the rule, and in the disease or diseases now under consideration, the early history is the only one which will enable us to form a correct diagnosis.

If we refer backwards to the first symptom which indicated the approach of the gelatiniform disease of the synovial membrane, and which we have described as being the result of an inflammatory process, we shall generally find symptoms which clearly indicate such an action; it may have been the result of a blow, a wound, or some other mechanical injury; or

it may have commenced without any known cause; pain, followed by swelling of the peculiar character seen in synovitis, with other symptoms of this disease in its subacute or chronic forms, will generally be traced. This attack may have been subdued by treatment, and a second may have followed at uncertain intervals; a third or fourth may succeed, the symptoms perhaps being less marked, but still evident; and if the patient then comes under our observation, what shall we find?

The joint, if it is the knee, will be uniformly enlarged; between the bones there will be perhaps some unnatural projection, and upon manipulation this projection will feel of a somewhat firm, semi-elastic, and doughy character; the joint will probably be partially moveable, although the patient will complain of a sensation of great stiffness. Some slight pain will be experienced, but more of an aching character, an occasional dart taking place through the articulation.

If the disease has so far progressed as to be associated with suppuration and destruction of the joint, other symptoms will be present, such as discharging sinuses, with greater pain on movement; the cellular tissue external to the articulation becoming involved, the skin will be more fixed, and a brawny sensation given upon manipulation. These symptoms are sufficient to enable the surgeon to diagnose the disease; they are the symptoms of different attacks of inflammation, subdued only to be repeated; and

the result is only what we should have expected when an inflammatory disease is unchecked, and allowed to take its course.

The symptoms which indicate the approach of the pulpy degeneration of the synovial membrane are of much less marked character. They are purely local, and are characterised more by negative than by positive qualities. The joint will simply gradually enlarge; this enlargement will be associated with a stiffness of the articulation, and perhaps an occasional dull pain, but there will not be present any symptoms which indicate a distinct inflammatory attack. The enlargement will continue, and an examination of the joint will yield characters similar to those I have already described in the gelatiniform disease, the difference between the two classes of cases depending more upon their history and progress, and if this is carefully attended to, a mistaken diagnosis will but seldom occur. There may be difficulty in forming an opinion, but by carefully catechising, and entering into the early symptoms, the case may be made out; whereas, by attending only to the present condition of the part, an error will certainly be made.

Section III.

Treatment.

If the pathology of the diseases which have just been described may be regarded as correct, the principles of treatment which should guide the practice of the surgeon are not difficult of comprehension; and as the first form of disease described as the gelatiniform degeneration of the synovial membrane may undoubtedly be classed amongst the inflammatory diseases, the treatment must be such as has an influence in checking such an action, and in encouraging the absorption of such inflammatory products as have been poured out, and have become partially organised.

In examples which come under observation in an evident state of subacute inflammation, the treatment recommended for subacute synovitis should be employed; the joint should be preserved in absolute repose, by means of pillows, sand-bags, or splints. Leeching to a moderate extent should be resorted to, or the application of blisters; and mild mercurials, as the gray powder, or the bichloride, and Dover's powder given with great care.

When pain, and all signs of active disease have passed away, the object is to obtain absorption of the material which has been poured out by the inflamed tissues, and, undoubtedly, the best and most effica-

cious treatment is that which the late Mr. John Scott employed for many of the chronic diseases of the joints, with such good results. I allude to the application of the compound mercurial ointment spread upon lint, and preserved in position by simple adhesive plaster, and over this two layers of soap-plaster spread upon thick leather: by this treatment there is no doubt that much of the thickening which follows an inflammatory process becomes diminished, but it is only by the constant application of the remedy, by the pressure being made in an equable manner, and although tolerably firm, not powerful enough to arrest the circulation.

In the same manner the Emplastrum Ammoniaci cum Hydrargyro is of great value.

If there be a tendency to contraction of the limb, this tendency must be counteracted by the application of an angular splint, furnished with a screw, by which the limb may be restored to the most desired position: or any other of the mechanical appliances may be resorted to which have been invented to produce the same end; Mr. H. Biggs's, perhaps, being the most valuable.

The health of the patient should be preserved in as good a condition as possible, by liberal diet, good air, and other hygienic measures; and by such treatment I am sure that I have seen many cases considerably improved, and the disease subdued. The joint having advanced far in this disease may not perfectly recover, but the disease may remain in a

torpid condition, and thus leave the limb a useful member.

In the pulpy degeneration of the synovial membrane, a similar plan of treatment should be adopted, the chief efforts of the surgeon being directed to improve the general health by tonics, good living, and good air. The joint should be preserved at rest and in a good position, by mechanical appliances, and pressure applied as previously directed. This treatment should be continued for many months, and if it does not cure the disease, it retards its progress, and preserves the limb.

When, however, from either of the two forms of diseased synovial membrane, the joint suppurates and disorganizes, other considerations come into play; if the discharge, and the irritation produced by the diseased articulation, should tell injuriously upon the health of the patient, and the hope of restoring the joint to a useful condition be slight, if it exist at all; some operative interference may be called for. Amputation would have been, in former days, the method advised; but in these, when conservative surgery is making such rapid strides, other means, such as excision, may be the best; but as this question will be considered in another chapter, it is not necessary for me to do more than allude to such operative interference in this place.

CHAPTER III.

THE DISEASES OF THE ARTICULAR CARTILAGES.

Section I.

As a sound pathology forms the only true basis of a rational and scientific practice, I shall commence this section of my subject by describing, as clearly as it is in my power, the different changes of structure which the articular cartilages undergo in their various diseases; and as the results of my investigations upon this subject have been already published in a separate form, I shall not hesitate to transcribe upon these pages what was then written. But before entering upon the more immediate subject of the pathology of a structure, it will be as well to give a short outline of the mode by which the articular cartilages are nourished. Articular cartilages, standing as they do upon the confines of the two anatomical divisions of tissues, hard and soft, offer to the anatomist an unusually good opportunity of examining the process of cell develop-

ment, and afford equally to the pathologist the means of studying the changes which nucleated cells undergo in their degeneration or decay.

The difference as to the mode of nutrition between what are called vascular and nonvascular tissues (to which latter division articular cartilages belong) is now known to be but slight, and the method by which these latter structures are nourished is no longer doubtful. The blood being conducted by its ordinary vessels to every tissue, each tissue extracts or rather imbibes the materials requisite for its nourishment, the only difference between the vascular and nonvascular parts being determined by the spaces through which this process of imbibition takes place (the vessels in the latter not perforating its substance). The nucleated cells, however, through which all structures are formed and grow, still absorb from the vessels, however distant, their quantum of nourishment; and in articular cartilages these cells are as active as in any other tissue.

The method by which these blood-vessels supply the articular cartilages may be thus briefly described, the necessity for understanding their vascular supply being evident when their pathology is discussed. The investigations of Birkett, Toynbee, and others, have well demonstrated that it is through their bony attachment that they derive their chief nourishment. The vessels at their bony base form loops, and yield their nourishment to the cells of the

cartilage, somewhat in the same manner as the vascular loops of the corium nourish the epidermic scales. And believing, from pathological observation, that the cartilages are also covered with a layer of synovial membrane, I conclude that the vessels ramifying in it, and around the cartilages, furnish to their adjacent surfaces a sufficient supply.

It is clear, then, that structures thus deriving nourishment through others although adjacent tissues must depend much upon the integrity of these tissues; and that if any disturbing cause should arise to interfere with or arrest the process of nutrition through them, the same, if not an increased perversion of nutrition must ensue in the tissues thus secondarily supplied. In the cartilages of joints such a result may be most admirably witnessed. But as this subject will be further illustrated under the head of Degeneration of Cartilage, it is now needless to dwell upon its importance.

The *Diseases* to which articular cartilages are liable may be thus classed. Like other tissues they may undergo *hypertrophy*, or *atrophy*, using the latter in its simplest sense. Inflame and ulcerate they cannot, as the presence of vessels in the tissue is generally considered necessary for such processes. But to *granular*, *fatty*, and *fibrous* degeneration they are peculiarly liable, and in these forms of degeneration may be included the processes which have been so variously described by different authors.

Hypertrophy of Articular Cartilage.

That hypertrophy may exist, under the same circumstances that generally induce such a result in other tissues, cannot be denied: that is, in cases where an unusual quantity of blood, or liquor sanguinis, is supplied to the tissue; or when the functions of the part are called into unusual exercise. Whether such has occurred in articular cartilage I am not prepared to state; it has not fallen to my lot to witness a single instance, and I know of no genuine case where such existence was demonstrated. Cases are reported where the cartilage was found much thicker than natural, but, in all, some disease of the joint or neighbouring parts was present; and it may be questioned whether such thickening was not the result of softening and mere swelling of the tissue, or other pathological change. In many instances I have observed cartilages which to the eye appeared healthy, although thicker than natural; but on careful examination by the microscope and otherwise, degenerative changes were detected.

That hypertrophy from simple excess of function should occur seems almost impossible, as the mind can hardly conceive a position in which such a demand could be made.

That excess of vascular supply should also induce this result, appears equally doubtful, as in cases where such supply is present, the neighbour-

ing synovial or bony structure must necessarily be involved; and as congestion of these parts can hardly exist without some perversion of nutrition of the tissues themselves, the cartilage, nourished only through these tissues, must necessarily suffer, and as a consequence any *other* change rather than hypertrophy is likely to result. However, it must be remembered that great authorities have stated that simple hypertrophy may exist, although they fail to give us undoubted instances of its presence; at any rate it may be confidently affirmed that such a condition is remarkably rare.

Atrophy of Articular Cartilage.

That cartilages atrophy, daily experience gives positive evidence, confining the meaning of the word to simple wasting. In old people this is one of the many signs of natural decay; and in middle age it may occur when any of the requirements for healthy nutrition are imperfectly fulfilled. The process, as in all natural atrophies, is of a slow character; the cartilage becomes thinner by degrees, but retains all the characters of healthy structure; the thinning is also in most cases general, but in younger subjects particular parts only may suffer. In some instances the whole cartilage may entirely disappear, exposing the surfaces of the bone, which is then altered in character; for, remembering the

souree of its vaseular supply, we eannot but observe that the same defect of nutrition must affeet equally the eartilage and the bony lamella, to whieh it is normally eonneeted. This bony surfaee then beeomes degenerate, but it assumes the form of ealeareous degeneration, to whieh it is the most liable.

Granular Degeneration.

The next form of disease to whieh artieular eartilage is liable is one of unusual interest, as it ineludes the majority of the eases of what is ealled *ulceration of cartilage;* but in these ultimate results may be traeed similar ehanges, so similar indeed as to make us believe that the same proeess of eell degeneration is the immediate eause of sueh appearanees, and to induee us to include all these ehanges under the one head of granular degeneration.

This name is given to distinguish it from another form of degeneration—namely, the fatty, to whieh eartilage is peeuliarly liable; and although in the granular degeneration fat is generally an important ingredient, still it is only seeondary in the order of events, and its presenee must not therefore induee us to elass together eases in whieh its existenee may be ealled aeeidental, and those in whieh it is evident that fat is the primary ehange.

In this form of diseased eartilage, the investigations of Professor Redfern have left but little for other investigators to discover, and my own re-

searches have but tended to convince me of the truth of his conclusions.

Microscopically, very similar changes are detected in the cells and the structure in which they are imbedded. The change commencing in the cells consists first of their enlargement and irregular distribution, instead of their general arrangement in groups and equal size. The cell contents then gradually become granular, and the nuclei become lost, as if split up, or degenerated into simple granules. These granules multiplying distend their mother cell, till at last the wall bursts, and the granules are dispersed into the hyaline tissue. Cavities are thus formed of all sizes, varying from the natural size of healthy cartilage cells to cavities of larger dimensions, till at last the structure is completely altered, but little else than granules being visible on microscopical examination.

The hyaline substance, in these changes, generally assumes a more passive action. During the gradual enlargement of the cells, its substance becomes apparently absorbed, offering but little obstacle to the cell changes; this absorption continues, till at last the cell cavities approximating unite and form larger ones, the hyaline substance itself almost entirely disappearing.

In other cases a different appearance is to be seen. If this cell degeneration has taken place upon the upper or synovial aspect of the cartilage, the cavities, instead of remaining imbedded in their

natural matrix, burst, and discharge their granular contents, tearing, as it were, the hyaline material, and giving it a fringed, villous, or fibrous appearance. The fibres assume all sizes and shapes; but in all the same process of their formation is visible, as their free margin and attached base, evidently composed of the hyaline structure, prove quite clearly their origin.

If the degenerative changes occur upon the surface of the cartilage in contact with the bone, allied appearances are visible. In some instances the hyaline substance itself becomes granular, this being apparently the change which it generally undergoes in rapid disease.

These degenerative changes may take place at any part of the articular cartilage; they may commence *primarily* in the cartilages themselves from some perverted or defective nutritive change, the reasons of which are as unrecognisable by us as are the reasons for the changes which occur in other structures. In such instances the disease may commence at any part, but more generally about the centres.

In some cases the *synovial aspect* is its *primary* seat; but *then* the synovial membrane will be found implicated, the changes in the articular cartilage being only secondary. For, remembering that it is from this membrane that the synovial surface of the articular cartilage derives its nourishment, it is fair to conclude that this surface would first show any changes that must ensue from an arrest or deficit in its nu-

tritive supply. That this is the ease, observation has fairly demonstrated, and in one instanee whieh eame under my observation the truth of this was so elear, that I am tempted to give the following outline of the ease :

Case 8.—A pale, strumous boy, æt. two years and a quarter, having three months previously suffered from searlet fever, was seized one week prior to his admission into Guy's Hospital with pain in the right hip. When admitted, the thigh was flexed upon the pelvis, and leg upon the thigh, and the foot inverted ; the slightest motion produeed intense pain, and pressure was intolerable ; but little swelling existed, and no eonstitutional disturbanee. To permit the straightening of the limb and application of a long splint, ehloroform was administered ; obstinate vomiting sueeeeded, followed on the sixth day by symptoms of hydroeephalus. These rapidly beeame worse, and upon the twenty-first day the ehild died eomatose, the twenty-eighth day from the first apdearanee of symptoms of diseased joint. The splint was at onee removed after the development of the eerebral symptoms, and the leg returned to its flexed position, and remained so till death. On attempting to move the limb the ehild gave evidenee of pain.

On neeroseopie examination, the joint was found quite moveable, the leg about its normal length and foot everted ; no distinet enlargement was observed.

On opening the joint, some sanguineous purulent fluid was found in it; the synovial membrane was generally deeply injected, softened, and floeculent, easily tearing on the slightest touch; the ligamentum teres was injected and softened; the cartilage covering the bone appeared natural, with the exception of a patch of so-called ulceration, about the size of a sixpence, to the outer side of the ligamentum teres in the acetabulum; and upon the corresponding portion of the head of the bone, the surface appeared red and injected. On microscopical examination the cartilage generally was found quite healthy. At the seat of "ulceration" in the acetabulum, the surface was somewhat villous, from the fibrous formation of the hyaline structure, and granules alone were found upon its surface; immediately beneath this, some few enlarged cartilage-cells were visible, but beyond the edge, and beneath the surface, the structure was *quite* normal. The synovial membrane upon the head of the bone, corresponding to the ulcerated surface, was red and injected, and evidently in an early stage of inflammation; this action was quite local, and its boundary well defined. The surface of the cartilage beneath this injected patch had become perfectly degenerated into granules; a layer of these was seen immediately beneath the synovial membrane, beneath these were cartilage-cells in the several stages of degeneration, and beneath these were perfectly healthy cells and structure. This change in the cartilage was also *quite local*, and con-

fined to the surface beneath the inflamed synovial membrane.

In the preceding case it will be evident that the synovial membrane was the part first involved, and that the cartilage beneath that portion of the inflamed membrane was the *only* part in which degenerative changes had taken place, and that these degenerative changes were confined to the surface only. In considering the changes that had occurred, it will be seen that they are essentially similar to those previously described. The cell-corpuscles had gradually enlarged, and become filled with granules; these granules had escaped into the hyaline-matrix, which either had become granular itself, or had been entirely absorbed. That the former was the case is most probable, as the same abnormal nutrition which had induced the granular degeneration in one part of the structure is liable to involve the other also. That the synovial membrane at this spot was entire and injected is a point of peculiar interest; for it gives an insight into the process which has been generally described as ulceration of cartilage, and, indeed, may help us to understand something more of ulceration generally; for if this membrane had been destroyed, an ulcer (so called) would have been visible; but as it is, it is fair to conclude that this membrane became inflamed; the nutrition of the cartilage, which derives its vascular supply through it, became interfered with, or, perhaps, arrested; the tissue itself

passed into a lower grade of animal compounds, perfect granular degeneration having taken place.

May not this be the process of ulceration generally? In this case the whole series of changes may be said to be actually visible, and is it not fair to conclude that in other tissues, not placed so favorably for observation, similar changes are gone through; that inflammation, which we know does produce abnormal nutrition in a part, is followed by the same series of changes; and that granular degeneration of the cell-structure, whatever that structure may be, is the element of that process which we call ulceration?

In many instances the changes in the cartilage commence upon their bony attachment. In acute or chronic inflammation of the heads of bones, strumous or otherwise, and in any other case where the nutrition of the bone has become defective, the cartilage must necessarily suffer, and *then* similar degenerative changes will be observed upon the surface of the cartilage in connexion with it. The cartilage will be found to be easily separable from the bone, and in more advanced disease simply in apposition with it, having evidently been, as it were, thrown off from its osseous connexion, and it may then be almost regarded as a foreign body. Its principal supply of nourishment having been taken away, rapid degeneration follows, the cartilage, as it were, then melting away.

To the eye, in these cases, the synovial aspect of

the cartilage may appear quite natural; and in the early stages the chief symptoms of disease will be manifested only by the ease with which the cartilage is stripped off the bone; in other cases, pus or a new vascular membrane will be found intervening between the cartilage and the bone. The cartilage upon this surface may appear merely rough or wormeaten, or, in other cases, as if thinned by gradual solution. Microscopically, however, other degenerative changes will be visible, similar to those which have been previously described.

Fatty Degeneration of Articular Cartilage.

The second form of degeneration which claims attention is the fatty, and it is one which is constantly found in joints which have been deprived of their natural function, from any cause whatever. That such a result might be expected is natural, as a similar degeneration is known to take place in any other structure (however vascular that structure may be) simply from non-use. Articular cartilages, from their dependence upon the integrity of other structures for their vascular supply, would naturally be more prone to such a form of atrophy; and, practically, this is found to be the case.

Whenever a joint has been simply at rest, whether from disease around it or in some of its structures, this degeneration may be found. The eye itself will almost always detect at once this change of con-

dition, even in an early stage. The cartilage will generally present an undulating, unequal, but smooth surface; some parts will appear more transparent than natural, in contrast with the white pearly aspect of other portions. The cartilage may be found three or four times its natural thickness, simply from swelling of its tissue; it will cut soft, and at times may even be pulped by moderate pressure. It may be removed from the bone without much difficulty, although not peeling off so easily as it does when the bone itself is the primary seat of disease.

The microscopical appearances are most characteristic. The change evidently commences in the cells themselves. In its earliest stage one or two fat-globules will first be detected in the cartilage-corpuscles; these gradually increase in number, till the corpuscles disappear, large cavities in the hyaline-matrix being formed. These cavities unite and form larger ones, till the structure itself becomes pulpy, breaking down upon the slightest provocation. The hyaline-matrix takes on the same change, becoming apparently first granular, and then fatty in its degeneration.

Case 9.—The best instance of this form of degeneration which I have seen, occurred in a woman, æt. 53, who for three years had been suffering from abscesses around the knee-joint. When seen, the leg was flexed upon the thigh at an acute angle; the

slightest motion was permitted, but any attempt at extension indueed severe pain; when pressing the surfaces of the eartilage together, no abnormal symptoms were deteeted. The whole integument round the joint was riddled with sinuses, and many open uleers existed. Her general health was very indifferent, and amputation was requested, and performed, from whieh she subsequently reeovered.

On examining the joint, the integument was found firmly united to the eellular tissue beneath, whieh was thiekened and indurated from inflammatory deposit. The synovial membrane was elear and transparent, and eontained within its folds mueh fat. The eartilage presented an appearanee exaetly similar to the deseription previously given: the surfaee was glistening, undulating, and smooth—in parts semi-transparent; it was about three times the natural thiekness, soft to the knife, and removed from the bone with eomparative ease, although its strueture broke on removal. The eartilage had eompletely undergone the fatty degeneration, all signs of healthy eells having disappeared; large eavities eontaining granules and oil-globules were alone visible, imbedded in a granular strueture. The fibro-eartilages were also quite transparent at their edges, and gave similar evidenee of fatty degeneration. The bones were brittle, and their cellular strueture filled with fatty serum.

The above ease affords an exeellent instanee of

fatty degeneration from *non-use;* the joint itself having evidently only wasted from being deprived of its natural function, from the disease in the cellular tissue around it.

It is to this form of disease that the rapid removal of cartilage from the bones of a chronically-diseased joint in an attack of inflammation may be attributed. The structure having lost its power of resisting any abnormal inflammatory process, easily breaks down, and a few days alone may be sufficient to strip the heads of the bones of their natural coverings. This is particularly well observed in cases where long-continued disease, external to the joint, has been followed by an accidental attack of synovitis; most rapid disorganization of the joint generally follows, and it is fair to conclude that such rapidity of the process is due to the cartilages having lost almost all their powers of resisting the inflammatory action, on account of having assumed a lower position in the scale of organic structures.

Fibrous Degeneration.

The fibrous degeneration of articular cartilage is a disease of a peculiar character. It seems to take place very gradually, and without any marked symptoms, unless vague but constant articular pains may be regarded as pointing to its presence. It is generally found in people of a gouty or rheumatic diathesis, and is evidently a change originating in

the cartilage itself. This form of degeneration is frequently associated with a hardened or calcareous degeneration of the osseous lamella; and, strangely enough, a deposit of new bone of a dense character, fringing the articular surfaces, is a frequent associate of this degenerative change.

To the eye, the first visible alteration of structure consists in the surface of the cartilage losing its smooth glistening appearance. Small fissures may next be seen, and these are very constantly in the centre of the cartilage, radiating from a given point; these fissures, vertical to its surface, may extend, in an early diseased condition, through only a portion of the thickness of the cartilage, but in advanced cases the bone is bared. These fissures gradually deepen and become wider, the process continuing till the bone is uncovered, when its hardened or calcareous degeneration will be made apparent.

Microscopically, other changes are detected. Fibres of all sizes will easily be seen, with corpuscles interspersed between them; the hyaline structure has disappeared, having apparently become fibrous. In an early condition of the disease, the change will be seen to have commenced in the cells themselves; a granular degenerative change, similar to that previously described, may be traced through all its stages; but this change is of a *chronic* character: the cells enlarge, but *more* slowly; they make their way to the surface, but with *less* rapidity; and when their granular contents are discharged, the hyaline

material, instead of having become absorbed or degenerated into molecules, puts on the fibrous appearance from the mere splitting of its structure. Subsequently, as in all other degenerations, the parts gradually disappear, and then the hardened, bony, ivory-like, or porcelanous articular surface will become apparent. Pressure seems to have some influence in hastening this removal of the parts, as it is often found in those portions of the joint where such an influence can be experienced.

This form of degeneration is generally found in old people, who are liable to gout or rheumatism, but it may frequently be seen in joints in which no disease was ever suspected.

There are other changes in articular cartilages not included in the preceding divisions, which are generally found in old gouty or rheumatic subjects; and if the changes themselves cannot be ascribed to the presence of such a poison in the blood as exists in these diseases, they are at any rate closely connected with such conditions.

The first change is very characteristic; as the gouty materials themselves are deposited upon and within the structure of the cartilage, its surface is rendered white, and minutely granular, as if sprinkled with the characteristic materials of gout. In the museum of Guy's Hospital is a splendid specimen of this disease, and in other museums may be found many others; it was removed from a patient who had been for some years more or less affected with

articular pains. The faces of the cartilages are covered with a deposit of lithate of soda, according to Dr. Rees' analysis; concretions of a similar kind, but varying in extent, are imbedded in the synovial membrane in patches, and are also in the ligaments and cellular texture surrounding the articulations. The largest of these deposits was half an inch thick, and nearly two inches in length.

In other cases, the cartilage has been partially absorbed, a porcelanous or dense bony surface corresponding to its former position. These may be *more advanced instances* of the fibrous degeneration; or the cartilage may have in itself become osseous or been converted into bone, not however as a separate structure, for, as Toynbee expresses it, "the articular cartilage, during the whole of life, gradually becomes thinner by being converted into bone."

This change is generally found in old rheumatic subjects, but it may be seen in others of a less advanced age, the cartilage having wasted, and the bone become dense or porcelanous from calcareous degeneration, the result of some perversion of the nutrition of the bony lamella of the joint. That this change in both tissues depends upon a similar cause is clearly seen in the following case:

Case 10.—A sailor, æt. 34, of intemperate habits, and liable to what he called rheumatism, six years prior to his admission into Guy's Hospital, without any known cause, experienced a swelling of the right

knee-joint. This enlargement was unattended by pain, but he was unable to use the limb. The swelling continued to increase, and the joint gradually became flexed. When admitted, the joint was somewhat enlarged, flexed at a right angle and fixed; the tibia and fibula were partly dislocated backwards, and many fistulous openings existed, communicating with diseased bone. There was slight increase of heat and tenderness, and at times considerable pain over the tubercle of the tibia, but no constitutional complications. The thigh was amputated at its lower third by the flap operation, and erysipelas, followed by pyæmia, proved fatal upon the eighth day.

On examining the joint, it was found that all signs of healthy structure had disappeared; the cartilages covering the ends of the bones were entirely destroyed, not a vestige remaining. The surfaces of the bones were irregular, and upon them were numerous loose white portions, which had evidently formed their articular surfaces, and had hardened, eburnized, and been thrown off. One condyle of the femur was conical, with a similar porcelanous deposit upon its summit, the surrounding parts having been deprived of the bony lamella, exposing the cancellated structure. The crucial ligaments were entire. The synovial membrane over the *patella* was inflamed and swollen. The cartilage over this bone was *quite* healthy. The bones, except at their articular surfaces, were not diseased. The lungs contained

masses of pyæmie lobular pneumonia. The kidneys were coarse and fatty, as also was the liver.

Here, then, is a case of disease of the joint occurring in a young man of a rheumatic diathesis. The disease had progressed slowly for six years, and no active mischief had taken place, but by a slow and chronic process the nutrition of the cartilages and articular facets had become interfered with. The cartilages, being *dependents* for their nutrition, had first suffered, degenerated, and melted away; the bony surfaces, unable to resist the same perversion of nutrition, had at last yielded, and literally sloughed. The parts beneath, being healthy, demonstrated the local character of the affection. That the patella-joint should have escaped this general affection is a point of great interest, since it proves its nutritive supply to be less liable to interference than that of the other parts of the joint.

Section II.

Diagnosis.

If the reader has carefully perused the previous pages describing the pathology of the articular cartilages, he cannot fail to have observed that the diseases of this structure are, as a rule, secondary in

the order of events, and that the cartilages suffer merely from the extension of disease from the bone or other tissues.

Primary disease of the cartilages undoubtedly exists, but the symptoms by which it may be diagnosed are most uncertain, and even by care an approximation only to truth must be expected.

When a cachectic and weakly patient has been confined to bed for many months, from any disease of an extremity which does not allow of motion of the joint, although there may not be any symptom of disease of the articulation, a fatty degeneration of the cartilage may be suspected; any slight injury to the joint in these cases will be followed by its rapid disintegration, proving the small vitality of its anatomical constituents. If an abscess should break into the joint, or any disease of the bone extend into it, a similar result follows; and the annexed case, perhaps, illustrates this fact better than any mere description.

Case 11.—A man, æt. 20, of a delicate and strumous diathesis, was admitted into Guy's Hospital under Mr. Hilton, with a subcutaneous abscess on the inner side of the left knee-joint. For three months previously he had been suffering from a strumous abscess in the neck, and the abscess on the knee appeared one month before admission. He had been kept perfectly at rest, and had not walked or used his joint. On admission the joint was quite sound,

and upon its inner side an abscess existed about the size of an orange. Tonics and good diet were prescribed; and after the man's health had somewhat improved, this abscess was opened, as it had much increased, and it was feared that it might break into the joint. He progressed well for three weeks, when the joint suddenly became painful, free discharge of an oily purulent material containing fat-globules in abundance followed, and death in six weeks, the man being worn out by the discharge complicated with pneumonic phthisis.

Upon examining the joint it was seen that the abscess had ulcerated into the joint, the internal condyle of the femur projecting into the abscess. The cartilages had entirely gone, exposing the bone, which was on section soft, easily cut with a knife, and the cancelli were filled with fatty matter.

In this case the sequence of events is not difficult to trace. In such a subject degeneration of tissues would always proceed rapidly, and the cartilages had probably become quite fatty; the discharge from the joint, containing abundance of genuine fat-globules, is most peculiar and characteristic, and the subsequent condition of the bone renders such an opinion most probable.

When disease has existed in the heads of bones for some time, uncomplicated with any affection of the joint, and when slight but shooting pains within the

articulation, or an aching in one spot, supervene, some disease of the articular cartilage should be suspected. The granular degeneration is the form which probably exists, as repeated observation and microscopical examination have led me to believe; but when the pain is of a more constant and severe character, and when jumping and starting of the limb takes place, the destruction of the cartilage may then be anticipated; and if this continues, synovitis and its symptoms generally appear, followed by the disorganization of the joint.

In cases of acute or subacute synovitis, or even in the chronic form, when seen in subjects of small power, and with what is called a strumous diathesis, the same symptoms will indicate the same mischief, and a similar result ensues.

Fibrous degeneration of the articular cartilage is more obscure. It is seen in rheumatic subjects, and appears to be a result of the so-called chronic rheumatic arthritis. It is remarkably slow in its progress, and marked by no positive symptoms. In old and middle-aged patients, where rheumatic pains in a joint alone exist, it may be found; but it is as often seen in subjects where no such history, or, indeed, any history of joint-affection, can be traced. I have seen several specimens from the dissecting-room, where of course no history can be obtained, and the probability of its existence may only be surmised in the cases I have alluded to.

There is a form of disease which approaches the

nearest to primary disease of the cartilage, in which this structure rapidly disappears, followed by or connected with suppuration of the joint; it is seen in patients of middle age, who have had an attack of rheumatism, which at last settled in one joint. In these cases rapid disintegration and suppuration follows, and I have been tempted to separate them from other forms of disease of the joint, as in their progress and termination they are unlike all others. The disease is at first confined entirely to the cartilage, involving the synovial membranes in a secondary manner. The cartilage may disappear, and in healthy subjects anchylosis may rapidly take place, and it is not unfrequent to find such a result. In cachectic subjects the joint suppurates and rapidly disorganizes, and upon examining the joint the cartilages will have disappeared and with them the surfaces of the bones, but these exposed bony surfaces will not appear to be diseased, and it will be evident that the disease had extended from their surfaces downwards. The synovial membrane will also present all the appearances of destructive inflammation.

The pain is generally of an acute gnawing character. The heads of the bones, or rather the fibrous coverings, will cause pain when touched, and motion is intolerable. In a few days swelling of the joint will appear, which in a good and healthy subject may rapidly subside, but in a cachectic one suppuration will follow, with all its evils.

The following example will illustrate the subjeet.

Case 12.—A woman, æt. 40, was admitted under the eare of one of the physicians with what was ealled an attack of rheumatism. It commenced two weeks previously, after exposure to wet; and after attacking several joints it "settled" in the left knee. When admitted the knee was much swollen, hot, and exquisitely sensitive. There was severe eonstitutional distubance, fever, and bronchitis. Any attempts to move the joint produeed pain. The left arm and shoulder were also slightly affected. Within two weeks the effusion into the joint disappeared, but it was still as painful upon manipulation and motion; within one week the joint again enlarged, evidently from suppuration; the constitutional disturbanee was very sevcre, and she was transferred to Mr. Birkett's care. The joint was then opened and pus let out; it was not offensive, indicating that the bone was sound. After ten days, however, she sunk from the discharge and thoracic disease.

Upon examining the joint, it was found to be completely disorganized, and contained pus and the debris of structure; the patella was dislocated upon the outer condyles; the articular surfaces of the bones were exposed, and the lamellæ had disappeared; the bones were, however, otherwise quite sound.

The eartilages had almost entirely broken down; some spots, however, were present, presenting under

the microscope all the appearances of the granular degeneration.

The synovial membrane had partially disappeared, and plates of lymph covered the surface of the remainder.

In this case, the disease had evidently been confined to the cartilages and synovial membrane, and had probably commenced in the former; if the powers of the patient had been good, and life had been preserved, there is every reason to believe that the joint might have recovered with anchylosis.

Section III.

Treatment.

As it has been fairly shown that diseases of the articular cartilage are generally the result of the extension of disease from other tissues, such as the bone or synovial membrane, it is a necessary conclusion, that the treatment of such cases must be intimately connected with the treatment of the original disease, and that if such can be checked in its progress the articular cartilages may generally be preserved entire.

Such, then, should be the aim of the surgeon; for knowing that disease of the articular extremities of the bone, or of the synovial membrane, if left to

take its course, will necessarily end in the degeneration of the cartilages, and, consequently, the disintegration of the joint, the early treatment of these cases becomes of great importance to prevent such an unfortunate termination. When the cartilages have become diseased, and the joint either partially or entirely disorganized, the efforts of the surgeon must be directed to modify all inflammatory action, to preserve the powers of the patient, and to place the joint itself in as satisfactory a position as possible for a favorable result.

The cartilages being gone, the joint, as a joint, can never be restored to its original perfection; still a good limb may be obtained. The disease in the articulation being subdued, a useful limb may remain, although the mobility of the part may be much impaired. If all hope of gaining such a result be small or altogether futile, as it is in cases where disintegration of the joint has taken place, a stiff limb is the desired end to obtain, and the means to be adopted to procure such a result, besides general hygienic and tonic treatment, are absolute rest, preserved by splints, the joint being placed in the angle or position which is mostly to be desired. Much time and patience are required to procure this desirable condition upon the part of the patient and the surgeon, but it may generally be obtained by due attention on both sides.

When the joint is entirely destroyed, and when

the powers of the patient are suffering from the continued drain upon the system, produced by discharge or long-existing disease, operative interference may be called for, but the discussion of this important question must be postponed for another chapter.

CHAPTER IV.

THE DISEASES OF THE ARTICULAR EXTREMITIES OF THE BONES.

In the previous pages the morbid affections of the synovial membrane and of the articular cartilages have been freely discussed, and we now approach the subject of the diseases of the articular extremities of the bones, in so far as they have a tendency to produce disease in the articulation. They may be divided into two classes—the inflammatory, and the development of morbid growths, whether malignant or otherwise.

The inflammatory affections of the heads of bones are by far the most common. They are, therefore, the most important, and will consequently first claim our careful consideration.

Inflammation of the articular extremity of a bone may be found in two conditions—the acute or chronic. It may be the result of an injury, or it may appear without any local cause. It is seen in the healthy and in the cachectic, and when attacking the subjects of what is called the strumous diathesis it is described by authors as scrofulous disease of

the heads of bones. It is not unfrequently the result of constitutional syphilis, and is then denominated syphilitic caries. But in all an inflammatory process is the essential element, although this may be modified by constitutional tendency or local peculiarity.

Having its origin in an inflammatory process, the changes which the bone structure may undergo are similar to those which follow such an action in other tissues.

It may terminate, in the healthy subject, by resolution; and in the cachectic, by early treatment, a similar result may be obtained.

A local abscess in the bone may occasionally be a result, and if the pus can be discharged externally a cure may follow; but if otherwise, the disease will spread, and too often pass jointwards, and the destruction of the articulation be the end.

The bone, the seat of the inflammatory process, may die or become necrotic, and if the sequestrum is situated externally, or can be removed by operation, the disease may be arrested and a fortunate result ensue. But if such a result cannot take place, that is, if the dead portion is detached near the articular surface of the bone, and cannot be removed either by unassisted nature or by operation, the inflammatory process will continue, more bone will become involved, and more die; a passage will surely be made inwards towards the joint; the articular cartilages will soon become involved and

degenerate; and, finally, the sequestrum, or abscess, will be discharged into the articulation, and an acute synovitis, with the rapid disorganization of the joint, will be the consequence.

If the disease is not localized to a portion of the bone, but is diffused through the whole of the articular extremity, the cartilages will soon become diseased, and the joint likewise, and a similar result will follow, for the cartilages, depending upon the bone for their nutritive supply, cannot long remain intact when the sources of their nourishment become diseased, and their supply uncertain or irregular; and as a consequence, they rapidly undergo that form of degeneration which I have previously described as the granular, and destruction with suppuration of the joint follow.

In acute cases the head of a bone may rapidly die and be even thrown off, and it is needless to add with a rapid destruction of the joint. The cartilages slough or melt away; the synovial membrane undergoes an altered process, and all signs of an articulation disappear.

In such a case as this there is no difficulty in understanding the pathological process by which such a result ensues, nor is it necessary to describe the pathological changes which take place when an abscess or sequestrum from the interior of a bone has been discharged into the joint. They are palpable to any one who has but a slight knowledge of the process of inflammation and its results;

but when we come to the consideration of the chronic inflammation of the articular extremity of bones, where the process is very gradual and the symptoms obscure, but where the destruction of the joint must take place if the disease be not checked in its early stage, a more minute and careful description is undoubtedly required, and I shall therefore proceed to the consideration of that interesting but too numerous class of cases which have been described as the scrofulous inflammation of the heads of bone, first entering into the subject of its pathology.

Section I.

Chronic Inflammation of the Articular Extremities of the Bones.

If there is one rule more important than another, and which we, as pathologists, should always strive to follow, it is to describe pathological changes by terms so distinct that they may be understood by all, and to name diseases according to their pathological characters. And without entering at the present time upon the question, whether tubercular changes are not mere modified forms of the inflammatory process, I cannot for one moment doubt that the majority of the cases which are described by surgeons as strumous or scrofulous disease of a joint, and of the articular extremities of the bones, depend upon a chronic inflammation in the bone. The disease is, in its origin and progress, inflammatory; and by early

treatment may be arrested. The pathologieal eonditions found upon examination are those whieh an inflammatory proeess will produee, and it is quite exceptional to find in any bone that yellow eheesy material whieh pathologists so well know as strumous deposit; I do not deny that sueh a deposit may be oeeasionally present, but the eases in which it is found are so rare, that we may fairly regard sueh a speeimen as a pathologieal euriosity.

If, then, we eonfine the term strumous disease of a bone, as I believe we should, to sueh instanees only where sueh a deposit is present, as surgeons, we shall seldom have oeeasion to employ it.

If we examine the artieular extremity of a bone affected with this so-ealled strumous disease, what shall we find? In the earliest eondition simple vaseularity will be the prineipal morbid appearanee, the caneelli eontaining more serum than natural; we shall soon, as the disease advanees, observe that the artieular extremity of the bone is larger than natural, this enlargement being in some eases very great. Upon making a seetion of the bone, the saw will break through its strueture more easily than in a healthy speeimen, its earthy eonstituents having diminished.

Upon eomparing the strueture of the diseased bone with a healthy speeimen, it will be observed that its eaneelli are mueh enlarged, the eolumns radiating from the shaft in a palm-like fashion, as if they had been spread out from downward pressure. These eaneellated portions of the bone will appear

more vascular than natural, and the cancelli will probably contain some pinkish serum.

If the inflammatory process is of a tolerably healthy character, parts of the bone will appear denser and more indurated than the remainder, evidently from the organization of the inflammatory deposits, this deposit in bone always becoming osseous; too frequently, however, suppuration and death of the bone is the result, and a small or large sequestrum will be seen.

If we examine the denser portions of the bone forming its shell, it will be observed that it is thinner than natural; that it also appears as if it had been dilated; where the articular extremity joins the shaft some new bone may be detected, thrown out, as it were, to support its dilated ends.

The articulating surfaces will, in some parts, appear more vascular than normal; in other cases, more advanced, portions will be found loose and lying in the joint, having been like a slough thrown off. The denser portions of bone dying more rapidly than the cancellated.

If the cartilages are examined in the earliest stage of the disease, they may be found quite healthy; but when the disease has progressed so far as to involve the articular surfaces of the bone, the granular degeneration of their structure will be detected by the microscope, commencing upon the surface connected with the bone.

As the disease progresses, and when the surfaee of the bone is evidently injeeted and inflamed, the eartilage will be found to have been thrown off, and to be lying loosely upon the bone; and in more advaneed or more chronie eases it will entirely have disappeared. The disease in the articular surfaees of the bone, and in the cartilage in apposition with it, progress at an equal rate, disease in one being eertain to be followed by degeneration of the other, for the cartilage is, as it were, a dependent of the bone; for, receiving its nourishment through it, it must necessarily degenerate when that supply is interfered with or eut off.

The disease having commenced in the bones, and as a eonsequence having involved the articular eartilages, which have undergone degeneration and decay, the synovial membrane generally beeomes inflamed; the symptoms being very aeute when any portion of the bone has died, and been discharged into the joint. In this ease aeute inflammation and suppuration are sure to follow, and rapid disorganization of the joint is the result.

The description just given forms the brief history of the pathological changes whieh may be witnessed in what is generally called strumous disease of a joint; it may take months, or even years, before the final destruetion of the joint takes place; but unless arrested, sueh a termination must sooner or later be observed. The disease is evidently inflammatory in its origin and in its progress, although the process

is of a low type. Occasionally, but very rarely, a genuine strumous deposit may be detected in the bone; the progress of the disease, however, is unaltered; it advances in the same slow but certain manner, and terminates as surely in disintegration of the joint; the strumous deposit indeed rendering such a termination more certain, for acting as a foreign body, and having always a tendency to degenerate and break down, the inflammation is kept up, until an outlet for its discharge has been found. This outlet is almost always through the joint; it may take place occasionally in other parts, but such an opening is very rare, for the disease has a constant tendency to progress jointwards, and whether it is associated with strumous deposit or necrosed bone, these foreign bodies are, as a rule, discharged into the joint itself.

When the disease, as just described, takes place in the smaller bones, such as the carpal and tarsal, the same changes may be detected, and these changes are followed by the same results; the bones may be found soft and vascular, the cancelli being filled with bloody serum. Some will be seen pale on section, and perhaps denser from the organization of the inflammatory products; in others the bone will be found dead; if confined to the cancellated structure it will be called carious, and if to the denser portion necrosed; and in these smaller bones such a result is very frequent. The cartilages also will be found to have undergone the same changes as in other

joints, and the joints as a consequence will have advanced to different stages of disease.

Diagnosis.

Having given thus briefly the pathological changes which may be seen in the disease we are now considering, I will proceed to the consideration of the symptoms by which such changes can be diagnosed; and it is important that the earliest conditions of this serious malady should be well understood, for it is only in an early stage that much hope can be entertained of arresting its progress.

Commencing in the bones, it is to them that we must first look for any definite symptoms; and the earliest which will generally call our attention to the part is some slight pain or aching; it will almost always be found in children, and those of a delicate and strumous habit; if the joint is one which can be easily examined, but little if any difference can be detected between it and its fellow; the pain is seldom great, but it is more of an aching character, and by firm pressure over some portion of the bone it will generally be increased.

As the disease advances, an evident enlargement of the bone will be detected, its articular extremity will appear as if dilated, and by comparison and measurement with its opposite will be found to be variably enlarged, the enlargement in some cases being to the extent of several inches. Some slight stiffness will then be

observed in walking, and the pain will generally be increased by exercise. The cellular tissue external to the joint may now perhaps become involved, but only to the extent of some slight thickening. As the disease advances, and the cartilages become degenerate, the pain in the joint becomes greater, this pain being much increased by walking or movement of the joint; startings of the limbs will now show themselves, and some spot about the joint will generally be more painful than another. When these symptoms are observed, effusion into the synovial cavity, if not present, will soon make its appearance, with all the symptoms of acute and chronic synovitis. The joint will then appear much enlarged and swollen, the points of bone being lost in the general enlargement: movement and pressure increase pain; and constitutional symptoms, hitherto very slight, now become much aggravated. Suppuration will sooner or later appear, and abscesses will open in all parts of the joint; and the character of the disease will be well declared in the total destruction of the articulation.

If this disease commences in the hip-joint, the early symptoms are seldom observed or witnessed, and limping is too often the first which attracts the attention of the parent, accompanied with some flexion and adduction of the thigh. There may be pain in the joint itself, and in the knee, or in the latter alone, and this will generally be aggravated by movement. When these symptoms are present, the disease will generally have advanced so far as to

make the case one of a very serious nature, and it is then a difficult task to restore the joint to its former perfect condition.

In delicate strumous children the earliest complaint of pain or aching of a joint should not be disregarded, and if it is at all lasting, the earliest stage of this chronic inflammatory condition of the bone should be suspected, and at any rate the case should be treated as if the disease existed. Parents are apt to treat the complaints of children, particularly of joints, as "growing pains;" but I think, as surgeons, we should condemn such a practice, and although careful not to make the public fearful and always on the look out for disease, we should always impress upon them the necessity of watching for early symptoms, in order to seek advice for disease in its earliest conditions, when this disease has advanced far in the hip, the symptoms are too well marked to render it necessary for me to recall attention to them.

Section II.

Treatment.

There are two principal facts which we must always remember in the treatment of these cases: *first,* that the disease is inflammatory in its origin

and in its progress; and *secondly*, that it is almost always found in subjects of a weakly constitution, and of small power. The constitutional treatment becomes then an important consideration, and the local must be subjected to more general considerations.

The first point is to correct, if possible, the disposition to disease, to supply power to the patient to resist the morbid inflammatory process, and to overcome its effect. Tonics become then both valuable and necessary, in any form that may suit the patient. Iron, in any of its forms, is generally to be preferred; my favorite preparations are the iodide in the form of syrup, or the phosphate, the latter combined with the phosphate of lime. Cod-liver oil is a good tonic, particularly when little nourishment can be taken, and may also be given either with or without the iron, but it is better to give them together. The diet should be simple and nutritious, and alteratives occasionally given. The patient should have as much air as possible of a bracing character, and, in fact, all general considerations should be employed to improve the health and weakly powers.

The local treatment is important, although somewhat secondary to the constitutional; for however correct the former may be, it will be useless unless associated with the latter, and *vice versâ*.

The joint should be preserved absolutely at rest. If it is in the lower extremity, no pressure upon it by

standing or walking should be allowed upon any consideration, and an elevated position is to be preferred. Blisters, setons, and such like applications, are not to be employed, as they are seldom of any benefit, and in some cases do harm. Leeching is, at times, a valuable adjuvant; when local pain and heat are great, a few leeches over the part will often afford great relief; and warm or cold applications, according to the relief they confer, may be employed to allay pain.

Absolute rest, and moderate support by the application of strapping, either alone or with some mercurial ointment, as the compound mercurial, is a valuable local remedy in more advanced cases.

In the earliest condition, when perhaps what are called growing pains are the only local symptoms, it may be asserted that mere rest and constitutional means are generally sufficient to restore the patient and arrest the progress of the disease.

When the disease is still recent, but characterised by distinct symptoms, a mild mercurial, as the bichloride of mercury in small doses, or the gray powder, combined with tonics, should be judiciously employed; and under its use, together with such general means as rest and constitutional remedies, a speedy cure may often be obtained. Mercury in any other form may be pronounced as being positively injurious, except as an occasional purgative.

When it has advanced a stage beyond, and some

decided symptoms of disease of the joint are present, the same treatment, with addition of the mercurial, as previously alluded to, and such local remedies as leeches, or hot or cold applications, may be all that is required. But when the disease has advanced still further, and the cellular tissue, &c., is partially involved, the mercurial ointment and moderate pressure by strapping may be advantageously employed; and if successful, the joint may be restored to its natural condition, or, at any rate, may be preserved as a useful limb.

But if the disease has progressed beyond this point, other considerations come into play; all hope of a restoration having passed away, it must be the aim and effort of the surgeon to make the best of a joint, which, as such, may be now considered as destroyed.

When the cartilages have degenerated or disappeared, and the synovial membrane and cellular tissue have become involved, the object of the surgeon must be to obtain an anchylosis of the joint. Constitutional means, as already given, must still be sedulously employed, and perfect rest and immobility of the joint preserved by splints or strapping in the position which is most to be desired. By such treatment, carefully applied, and after the lapse of long periods of time, such a result may generally be obtained; but it can only be by great care and much patience, both on the part of the surgeon and his patient.

When the presence of some necrosed bone is suspected or recognised, and perfect disorganization of the joint has taken place, some operative interference may become necessary. But the further consideration of this subject must be postponed for a future chapter.

CHAPTER V.

CLINICAL REMARKS, FURTHER ILLUSTRATING THE SUBJECT OF INFLAMMATION OF THE ARTICULAR EXTREMITIES OF THE BONES, WITH CASES.

In the observations with which I commenced the chapter upon the diseases of the articular extremities of the bones, I alluded to the various terminations which may follow upon an inflammation, acute or chronic, involving the head of the bones either as a whole or in part; and I then went on to consider the pathology, diagnosis, and treatment of the most frequent form, which I have described as the chronic inflammation of the heads of bones, and which authors have generally denominated scrofulous disease.

It is now my intention to return again to the subject of inflammation of the articular extremities, and to demonstrate, by the short notes of cases which have been under my observation in Guy's Hospital, the other pathological changes which are the result of such an inflammatory process, and to indicate the treatment which it is the most desirable to adopt.

It is hardly necessary to quote cases which have presented marked symptoms of a subacute inflammation of the bone, such as I have described in the last chapter, and which have recovered under the treatment which is there recommended; they are numerous, and the experience of most surgeons will furnish them with examples, but I am tempted to give the short outline of a case which came under my care some time ago, which well displays the slow character of the disease, and also the benefit of the treatment adopted.

Case 13.—A dark strumous-looking boy, æt. 8 years, presented himself to my notice in August, 1857, with some affection of the left knee. Upon examination, the joint was quite sound, mobility was perfect, and there was a total absence of all signs of synovial effusion; the head of the tibia was enlarged as if dilated, and upon firm pressure over it pain was excited. The boy complained of some stiffness on moving the joint, and, upon standing, of pain in the head of the bone; when at rest it was of an aching character, and this occurred after exercise.

There was no infiltration or affection of the integument over the part; and upon measuring the two legs over the head of tibia, the diseased one was one inch and a half larger in circumference. The history was that for six years he had complained of an aching pain in the part, increased by exercise,

but the mother had never sought any medical advice.

The child was ordered to be taken off his legs, and to preserve the limb in a horizontal posture as much as possible. The part was strapped up with leather strapping, and Scott's mercurial ointment, and a small dose of the bichloride of mercury—1-16th grain, in bark—was given three times a day. Cod-liver oil was also administered; all general hygienic measures were advised, such as good air and simple and nutritious food. After continuing this treatment for two months, marked benefit ensued. The pain in the part had quite left him, and firm pressure over it could be borne without inconvenience. The child had much improved in health, and was anxious to be allowed to run about. However, this was not allowed; the mercurial was omitted, and the syrup of the iodide of iron was given in half drachm doses with the oil. The strapping was continued, but without the ointment, and rest still enforced. After another month, as no return of pain had taken place, moderate exercise was allowed, but the tonic was continued for some time afterwards. No relapse ever took place, and at an interval of nearly two years this boy has perfectly regained the use of the limb, and after fatigue does not complain of any pain in the part. The enlargement of the bone has subsided, the leg being only half an inch larger than its fellow, and a perfect cure can confidently be pronounced.

The case just quoted is a good example of chronic inflammation of the head of the tibia in a strumous subject, and also well demonstrates the value of the treatment employed; but such cases of success are not common. In delicate subjects this disease, when of long standing, gradually progresses, at last involving the joint, and terminating only in its destruction.

We now pass on to another class of cases, in which the articular extremities of the bones are inflamed, but the action is of a more healthy character. The disease is slow in its progress and more marked in its symptoms, and unless arrested by treatment would as surely go on to the destruction of the joint.

Case 14.—A man, æt. 20, was attacked three years before his admission into the hospital with what was called rheumatic fever. Pain subsequently settled in the inner malleolus of the left ankle, and never left him. Upon admission, the bone was evidently considerably enlarged, it was somewhat tender upon firm pressure, and was the seat of a constant pain of a gnawing character. All forms of treatment had been adopted before his admission without benefit; and as it was evident that an inflammation of the bone was the real disease, and probable that some abscess or diseased bone was contained within the malleolus, the operation of trephining was pro-

posed by Mr. Hilton, under whose eare the patient was admitted.

This was aeeordingly performed, but without finding either an abseess or sequestrum. The bone, however, was remarkably dense, evidently from the organization of inflammatory produet. The operation was followed by immense relief, whieh has eontinued, although when last heard of he felt oeeasional pain in the part, this being upwards of a year after the operation. In this ease the bone had evidently been attaeked with inflammation of a ehronie, but healthy eharaeter. As is usual in sueh eases, the inflammatory produet organized, and thus rendered the bone more solid, and also larger. The relief afforded by operation was most marked, and its benefit was thus fairly demonstrated, the joint having been preserved in its integrity.

I have given an instanee of ehronie inflammation of the bone eured by treatment without operation, and a seeond where a similar result took plaee, although with less simple measures. I now propose to pass on to another termination of inflammation of a bone, namely, the formation of an abscess, and will illustrate it also by the details of a ease.

Case 15.—A boy, æt. 18, of a strumous aspeet, was admitted into Guy's Hospital under Mr. Birkett. For six months previously, without any known eause, he had experieneed a eonstant pain of a dull eha-

raeter on the outer eondyle of the right femur; at times it was more severe, and of a throbbing nature. As general treatment and the administration of the iodide of potassium gave no relief, and as the local eharaeter of the disease indieated local misehief only, and as a eonstant pain in the bone, aeeompanied with throbbing, rendered it probable that suppuration existed, the part was trephined upon the outer side of the right eondyle.

The diagnosis was eorreet, and an abseess was opened, about half an ounee of pus eseaping, and the eavity of the abseess presented to the finger that beautiful soft, velvety sensation, so well known to be present in sueh eases from the lining membrane of the eyst; all symptoms immediately disappeared, the parts gradually filled up, and the boy left the hospital eured.

In the eases previously given, the terminations of the inflammatory proeess have been in all short of death of the part. Sueh terminations, however, are not eommon in their nature, or frequent in their oeeurrenee. The result of inflammation of a spongy bone, or of an artieular extremity, is too frequently followed by its death, either in part or as a whole, sueh an aetion frequently taking plaee in eaeheetie patients, who are ill prepared to eontend against sueh an aetion. I shall now proeeed to illustrate sueh a termination by the short reeords of cases from my note-book, first quoting examples where

the disease has run its course without any operative interference, and subsequently I shall pass on to the treatment of others where surgery has been called into requisition.

Case 16.—The first case is one of partial death of the head of the femur; it was taken from a boy, æt. 6, who died from tubercular meningitis, under the care of Mr. Cock, in Guy's Hospital. The exact history of the case could not be obtained, but the duration of the disease in the hip had been about two years, and for many months discharging sinuses had existed around the joint.

The synovial membrane of the joint was found much thickened from old inflammation, and the articular cartilages had entirely disappeared. In the head of the bone, towards its inner and lower aspect, there existed a loosened sequestrum, extending backwards towards the neck. The bone around was healthy and denser than natural, evidently from old inflammatory action; no signs of tubercular deposit could be traced. In this specimen the history of the disease of the joint was tolerably clearly demonstrated. The head of the femur had become inflamed, and a portion of the bone died; as a secondary result, the cartilages had degenerated and had disappeared, and suppuration of the joint ensued; these results evidently being connected with the diseased bone. Nature having made an effort to expel the sequestrium, had loosened it from its attachments, but in

so doing had produced suppuration and disintegration of the joint.

If the sequestrum had been removed, a recovery might have taken place; as long as the source of irritation remained, such a result could not have been expected.

If the destruction of a joint ensues as a result of the death of a portion of the head of a bone, as the case just quoted fairly illustrates, it is not difficult to understand how a similar result must follow upon the death of the whole of an articular extremity.

Case 17.—A strumous boy, æt. 14, who was admitted into Guy's Hospital with disease of the hip-joint. The early history was very defective, but it was clearly made out that eighteen weeks before admission he injured his right hip when jumping over a ditch; acute pain in the joint and swelling of the part followed the accident, accompanied with suppuration and the formation of many sinuses. One week before admission his body became œdematous, and ten days afterwards he died.

Upon examining the right hip after death the whole joint was found to be completely destroyed; pus was infiltrated into all the tissues around, extending up the psoas muscle to the spine, and down the thigh. The head of the femur was lying loose in the cavity of the joint, having been completely separated from the shaft at the epiphysis. The pelvic bones for some distance round the acetabulum

were black and necrotic, and upon making a section of the head of the femur it was completely necrosed, but not soft and vascular, as is seen in other chronic conditions.

In this case the death of the bone was very rapid; acute inflammation of the joint and bone was the result of the injury, and, as a consequence, the total destruction of the joint, with the death of the part, ensued in less than nineteen weeks.

It would not be difficult to quote other cases, all illustrating the same point, whether of acute disease in the bone spreading to the joint, or of chronic inflammation followed by partial necrosis and destruction of the articulation as a result; but the examples already given are sufficient to indicate the connexion between the two, and there are few cases which the surgeon has to watch which give greater causes for anxiety, for this disease in the head of a bone, unless arrested in an early stage, is almost certain to be followed by the disease and total destruction of the joint. Surgical interference may at times prevent such a termination, even when necrosis has taken place, but this success is rare; and operative measures too often only hasten on what they strive to delay, namely, the disorganization of the articulation.

In the two cases last quoted, of inflammation of the articular extremity of a bone, followed by partial or entire death of the part, the destruction of

the joint followed without any attempt being made to prevent such a result. And although I have just asserted that operative interference in cases of necrosis of this portion of the bones is seldom followed by the result expected, viz., the preservation of the articulation, such a termination may occasionally take place, as is well illustrated by the following example.

Case 18.—It occurred in a boy æt. 17, who for one month had experienced a constant aching pain over the head of the left tibia. He had not received any blow or injury upon the part, and when admitted an evident enlargement existed, accompanied with pain on pressure. Rest and the application of leeches gave relief; but as the symptoms returned in greater severity, an exploratory incision was made over the part; some necrosed bone was found, involving the external shell of bone and passing inwards. This was removed by a gouge, and all the symptoms disappeared, the boy leaving the hospital quite well.

In this instance the disease was fortunately situated in the outer portion of the tibia, which could be removed without much danger to the articulation; but if the operative measure had not been employed, there is every reason to believe that the inflammatory mischief would have progressed and involved a larger portion of the articular extremity,

and, as a consequence, disease of the joint would have taken place. Such a termination was seen in the following case, where the same operation was performed, but without the same success. The disease progressed and involved the joint, which rapidly disorganized, and amputation and death was the result.

Case 19.—A man, æt. 35, of a strumous aspect, six months before his admission into the hospital, received a severe blow upon the head of the right tibia. The accident was followed by pain in the part, but not sufficient to keep the man from his work. At this time, however, it much increased, and by medical advice he kept at rest. The pain was of a dull, aching character, and never ceased, although at times it became more severe. When admitted, the bone was evidently much enlarged, and upon pressure being made his sufferings were increased. The joint was at this time quite sound. Knowing how the case must end if left alone, Mr. Cock, under whose care the patient was, cut down upon the part, and finding the head of the bone extensively diseased, removed as much as possible of the carious bone by means of a gouge. Within twenty-four hours of the operation acute synovitis made its appearance, followed by suppuration of the joint. The discharge being profuse, and the drain upon the man's strength evidently more than he could bare, amputation was performed, but, as is

too frequently the case in amputations for acute suppuration of a joint, pyæmia made its appearance, and the patient died.

Upon examining the joint, the whole of the articular extremity of the tibia was extensively diseased, the bone being infiltrated with pus and carious. Through the articular surface there was a small perforation, which had communicated with the joint, and its rapid disorganization was the consequence. The cartilages had entirely disappeared, and the synovial membrane was thickened and covered with patches of lymph.

The following sad case tends to illustrate the same subject. Inflammatory disease in the head of the tibia followed an injury, and nature made an effort to get rid of the necrosed bone by discharging the abscess and its contents externally. The morbid action continuing in the bone, surgery stept in, and attempts were made to remove the whole of the disease; suppuration followed, and the abscess, burrowing beneath the fascia of the leg, opened into the joint, producing its destruction, and although subsequent amputation was performed, death ensued.

Case 20.—A dark, healthy, strumous girl, æt. 21, was admitted into Guy's Hospital, having, nine months previously, received a blow upon the head of the tibia. The bone became painful after the acci-

dent, and in three weeks began to swell; in three months an abscess formed over the part, and had been discharging since. When admitted she complained of much pain over the head of the tibia, increased on exercise. There was an opening over the tuberosity of the bone, leading down to diseased bone. Upon moving the joint gently no pain was experienced, but upon firm pressure over it such was produced.

Attempts were made to remove the necrosed bone, but they were only partially successful, as the larger portion of the sequestrum was situated in the direction of the articulating surfaces. For several days all went on well, but upon the fifth some pain in the joint was complained of, but unaccompanied by any effusion. Upon the seventh day acute inflammation of the joint ensued, with severe constitutional disturbance; the joint was freely opened, giving exit to offensive pus, such as is very characteristic of diseased bone; and upon the fifth week after the first operation amputation was performed. Vomiting and pyæmia, however, appeared, and a fatal termination upon the eighth day.

Upon examining the joint the synovial membrane was beautifully injected, of a pink colour, thickened, and granular. The articular cartilages over the head of the tibia had disappeared, and in parts over the femur and patella some portions were seen lying loose on the articulation having been thrown off. The head of the tibia was uniformly diseased and

almost entirely necrotic, and the greater part of its articulating surface was involved. The external semilunar cartilage was softened and loose, and beneath it there was a communication with the suppurating wound external to the joint.

The operation in this case could not materially have hastened the destruction of the joint, if it had done so at all. The extensive disease in the head of the bone, and the fact of its articulating surface being so much involved, prevented the surgeon from believing that he had been the cause of such a serious result, as it was impossible that such a surface of carious bone could have been present without involving the articulation in acute disease. The operative interference was quite justifiable, although it failed in its object, as it gave the patient a chance of being relieved from a disease which must, if left alone, have soon involved the joint in its destruction.

To prove the truth of such an assertion, the following case may be quoted, as in it a similar disease existed with a similar progress; early operative interference partially succeeded, but was not subsequently employed until disorganization of the joint had taken place. As the diseased joint, with the history of the case, was brought before the Pathological Society by Mr. Birkett, I shall give the case in his own words.

Case 21.—An aged man, æt. 55, was admitted into

Guy's Hospital, under Mr. Birkett, in April, 1855. He complained of great pain in the head of the right tibia, and there were fistulous openings and sinuses leading to carious bone. The disease commenced five months before with pain, which was all referred to the knee-joint.

On the 24th of April the sinuses were laid open, and Mr. Birkett gouged out a large quantity of carious cancellated tissue from the head of the tibia. It was observed that there was no circumscribed collection of pus, but that the cancelli were full of this deposit, and that there was no detached mass of necrosed bone. A sinus extended through the bone into the popliteal space. A large cavity existed after the operation, but the wound nearly healed, and the man was relieved from great pain.

In February, 1856, nearly ten months after the operation, he again entered the hospital. The wound had never healed; the cavity in the head of the bone had not filled up, and the odour of the discharge from it clearly indicated the presence of more diseased bone. With a view to the removal of the disease he was readmitted, but after he had been in the hospital a few days he was seized with violent constitutional disturbance and acute synovitis of the joint. Upon the second day the joint was opened, and fetid pus escaped; but death followed upon the fourth day.

It was discovered post-mortem that the knee-

joint was filled with pus; and at the attachment of the posterior cornu of the internal semilunar cartilage there was a small hole, by means of which a communication was established between the joint and the cavity in the head of the tibia.

The macerated and dried head of the tibia exhibited a large cavity; in fact, merely a shell of the head of the bone remained. The opening was well marked, which established the communication above described. There are two ways, adds Mr. Birkett, in which the suppuration of the joint may have been established.

"1. By the pus from the cavities in the carious bone ulcerating posteriorly into the articular capsule of the knee-joint, and there exciting inflammation; or,

"2. Pus may have traversed the cancellated tissue of the bone, until, reaching the articular lamella of the head of the tibia, it may have penetrated and burst at once into the joint."

I had the opportunity of observing this case all through, and carefully examining the joint after death, and have but little doubt that the latter was the true cause. The articular cartilages were loosened from the articular surfaces of the tibia, and had in a great measure disappeared, the disease of the articulation having been produced by the discharge of pus into the joint through the bone.

I have thus concluded the series of cases illustrating the gradual progress and the results of acute

or chronic inflammation of the head of a bone; in all, if left alone and unchecked by treatment, disease of the articulation will ensue, and it would not be difficult to quote many other cases to illustrate many other points of practice; but to the careful student, who recognises the connexion between the two diseases, and who has carefully perused the previous pages, the gradual progress and marked symptoms exhibited by the examples quoted, will enable him to form a correct opinion of the nature of the disease, and will point out to him the necessity of subduing the inflammatory action in an early stage. When necrosis has taken place, it is true, operative interference may at times succeed, but too frequently it fails, and the destruction of the joint will take place. This result is more liable to occur, and the disease is more frequently seen in patients of a strumous or scrofulous diathesis; but the pathology of the disease is nevertheless the same in all, although when attacking delicate or scrofulous individuals the death of the bone is more liable to take place. It is on this account that it has been termed scrofulous disease, although I doubt whether such a term is truly applicable.

In acute cases, perfect rest in the horizontal position, with the limb elevated, the application of leeches and hot fomentations, with other anti-inflammatory remedies, should be sedulously employed. Mercurials should not be forgotten, as they have a very marked influence in arresting inflammation of

bone, and even in delicate patients they may be administered in the form of the bichloride or the gray powder. When associated with tonics, iodine has also a healthy influence, and may be given in combination with iron as its best preparation. The iodide of iron in the form of syrup is a most valuable remedy, and this may be given alone, or combined with cod-liver oil, and administered with mercurials as previously advised.

In the chronic cases the treatment, as given in the last chapter, should be employed, and any operative interference should be carried out after great consideration. The cases quoted will indicate sufficiently when such interference may be required, and will also act as a caution, not to entertain a too sanguine expectation of a successful result.

CHAPTER VI.

TUMOURS IN THE ARTICULAR EXTREMITIES OF THE BONES.

The articular extremities of bones appear to be a more frequent seat of tumours, whether simple or malignant, than their shafts. The reasons for this are somewhat difficult to fathom, and, however it may be explained, the fact remains. This subject is connected with the one now under consideration only so far as it involves the joints, and it can be easily understood that it would be impossible for any tumour springing from the head of a bone to develope to any great extent, without interfering with the movements of the articulation with which it is connected.

The way in which it affects the joint is generally purely mechanical; the disease, if it is a malignant one, may certainly secondarily involve other structures, and be followed by disorganization of a joint; but such a complication is not common, and these tumours interfere only with the movements of the joint by their position and size.

Any of the tumours which are developed in or upon bone may be found situated in or upon their articular extremities. The disease generally shows itself by some enlargement of the part, which may be the seat of intense pain; in others, the pain is of a very trifling character. If this new growth is developed within the bone, as is generally the case where the tumour is a myeloid one, the bone appears gradually to dilate; the tumour will present a smooth and uniform surface, and the movements of the joint will be only interfered with by its size. If the growth is developed upon the bone, and growing from its fibrous covering, it may and will generally present an uneven or unequal surface; if it contains much bony element it will feel hard; if fibrous, firm; and if cartilage it will generally give a bossy outline. When of a medullary structure, it will be rapid in its progress, and will present on examination an elastic surface, and in parts it may be firm and unyielding; in others, soft and semi-fluctuating. Both the external appearance and symptoms which mark the progress of the tumour vary with the seat of the disease, and with its structure—whether it is developed within the bone or upon it—whether it is more or less composed of bony or cartilaginous fibres, mycloid or carcinomatous material.

The symptoms which each growth may produce vary exceedingly, and there are none which can be

given as characteristic of any one. The diagnosis of these cases consequently is one of great difficulty; and, although at times there may not be much difficulty in forming a correct opinion as to the nature of the tumour, as a rule it can be but a guess, guided by the presence or absence of certain symptoms. The same rules which are usually regarded as of value in the diagnosis of tumours in other parts, are in these cases equally serviceable, and should not consequently be neglected, modified according to the difference of structure in which the tumours are developed.

It is not my intention in this place to enter upon this subject, and I only allude to it, in as far as it affects the use, or involves the structure of the joint.

When the tumours have so far developed as to interfere with the functions of the joint, some operative interference may be required, and there is but little doubt that amputation is then the correct operation—where it can be applied. It is needless to add, however, that if the tumour could be removed without involving the joint, such an operation should be performed, although, unfortunately, this is very rare. The probabilities of a cure by operative interference are the same as if the tumour was developed in any other position; if the tumour is carcinomatous, whether the fibrous or medullary form, a return must be expected, as the disease is merely a local

manifestation of a general tendeney to develope such abnormal growths. If the tumour be myeloid, it is probable that no return will take plaec, although in one ease whieh has eome under my observation the tumour returned in the stump, and also in the lungs. If the growth be of a fibrous or simple structure, an immunity from its return may with some confidence be pronounced. Indeed, a similar prognosis must be given in tumours which are developed in bone, as if they were situated in any other part.

I might quote many cases to illustrate this subject, but it is one only eonneeted with joints in a secondary manner, and is thus briefly alluded to here to remind the reader that sueh tumours exist.

In the Table A, printed at the end of the first part of this work, it may be seen that eleven examples of tumours developed within the articular extremities of the bones have been tabulated. Four of these were eaneerous, five, myeloid, one of the reeurrent fibroid, and one of osteo-sareoma.

In four, the eondyles of the femur were the seat of the disease; in four, the head of the tibia; in two the head of the fibula, and in one, the bones of the ankle-joint. In all, amputation was performed. Ten of the thigh, three of whieh died; one of the leg, which reeovered.

It may, therefore, be observed that amputations for sueh diseases are evidently more dangerous to

life than amputation for chronic disease of the joints, 30 per cent. proving fatal; whereas, about 13 or 14 per cent. only of the amputations for chronic disease of the knee-joint die from the operation.

CHAPTER VII.

DISORGANIZATION OF JOINTS.

In the previous chapters, the diseases of the synovial membrane, articular cartilages, and bones, have been anxiously discussed,—the pathology, diagnosis, and treatment of each having met with its due share of attention; and it now remains for us to take into consideration some of the terminations or results of such diseases.

It is unnecessary to dwell upon the instances of success, where the joint is left or has been restored to its natural condition, as this is the aim and object of all our treatment, and, indeed, few cases give more satisfaction to the surgeon. But such a result is unfortunately not always to be obtained, and disorganization of the joint, or anchylosis, is too frequently the result.

Disease of any one of the structures of a joint, if unchecked by treatment, and allowed to run its course, has generally but one termination; and that is the total destruction and disorganization of the articulation. It is of little consequence where the morbid action originally commenced—whether in

the bones, synovial membrane, or cartilages—in old, or rapid cases, all eventually become involved, each tissue suffering in proportion to the seat and intensity of the disease. When the articular extremities of the bones are the centres from which destruction has emanated, upon examining the disorganized joint the pathological conditions revealed seldom leave any room for doubt that it was in them that the morbid action commenced; that from such a centre the cartilages subsequently became involved, and that the destruction of the joint followed upon the discharge of an abscess or sequestrum into the articulation.

Examples given in a previous chapter may be referred to for the pathological conditions which will be found. The bone will generally be extensively diseased, the carious or necrotic condition extending more or less through the articular extremity. In some instances, a defined sequestrum will be seen; in others, the whole extremity of the bone will have died and been thrown off. Between these two extremes, all degrees may be detected, but as regards the joint the result is always the same; if pus from any quarter or a sequestrum however small should be discharged into it, but one result ensues—acute inflammation and destruction of the articulation.

Where the disease commences in the synovial membrane the destruction of the joint is not so common. In acute idiopathic synovitis, such a result may occasionally take place in subjects of low power;

but in acute synovitis, when produced by a burrowing abscess from the tissues external to the joint, or when occasioned by pyæmic poisoning, disorganization is sure to follow. The synovial membrane may be found in various conditions; it may entirely have disappeared, the whole tissue and parts around forming one large sloughing cavity; it may be intensely injected and covered with layers or fringes of lymph, or it may present appearance of extreme ulceration. The cartilages may have melted away altogether or in parts, and portions may be found loose in the articulation; the heads of the bones will then be exposed, and they will present a carious surface, but this carious condition, when thus commencing, rarely extends beneath the surface; and if the bone dies it does so only superficially and in small or molecular portions.

In the gelatinous or pulpy degeneration of the synovial membrane a similar result may follow. Abscess will be found within the thickness of the new deposit, whether inflammatory or otherwise. The cartilages will have disappeared in various degrees, exposing the articular facets of the bones, which will be more or less diseased. Suppuration in the joint will also be seen; and it will be evident that all hope of a restoration of the joint will have passed away.

Diagnosis.—In such cases the diagnosis is of no difficulty. The joint will be more or less riddled with

sinuses discharging either a scropurulent matter or a purulent discharge containing molecules of earthy bony matter, and very offensive, and by means of a probe bone will probably be felt exposed. The joint will be enlarged to various degrees, and will give to the hand a hard and brawny sensation, it will almost certainly be flexed, and the bones be frequently dislocated as a result; if mobility exists to a slight extent, a peculiar grating will be detected, produced by friction from the exposed and roughened surfaces of bone. The health of the patient will vary according to the severity or rapidity of the disease. If such a condition of joint is the result of a chronic process, more or less emaciation and a want of power will be present, proportionate to the original powers of the sufferer and the demand made upon the constitution by the continued purulent discharge.

If this destruction has been the consequence of acute disease, hectic and all the symptoms of depressed powers, with irritability, will probably be found.

Treatment.—But whatever the condition of the part or of the patient, the important question addresses itself to the surgeon, what is to be done? Has all hope of the restoration of the joint passed away? And, if so, what second best can be expected? Is the condition of the joint such, and is the disease so confined to the articular surfaces of the bone, that any

hope of produeing a stiff or anchylosed joint can be entertained? And arc the powcrs of thc patient proof against the demand which will neeessarily be made against them to ensurc such a rcsult?

If the answer to sueh qucrics can be given in the affirmative; that is, if all extension of disease in the joint has ecased, and there is now no bone or other eause still keeping up irritation, and thus interfering with nature's efforts of repair, the aim of the surgcon must be bent to obtain this most desirablc end. Let the joint bc placed, if it is not alrcady, in such a position as will, whcn fixed, be most useful to the patient, and let it be fixed firmly by means of splints, for absolute immobility of the joint is an essential element of sueeess, and this immobility must be preserved for many months.

During this period let the health of the patient be restored by all the resources of our art; let him breathe good and wholesomc air, and be fed upon food the most nutritious but unstimulating; wine and other stimulants must be given with care, but when demanded by old eustom or dcprcssed powers with a careful libcrality; tonics, sueh as iron, quinine, or eod-livcr oil, alone or in combinations sueh as suit thc taste and stomaeh of the patient, and other mcdicine administercd only when absolutely demanded.

With absolute rest of the affeeted joint, a restoration of thc health of the individual, and the lapse of time, an anchylosis of the joint may bc obtaincd,

but it can only be through much patience upon the part of the patient and the surgeon.

If, however, the joint is completely disorganized, and no hope of obtaining anchylosis can be entertained, whether from the extensive character of the disease, as must exist in necrosis of the articular extremity of the bone, or from a want of power upon the part of the patient, the question of operative interference becomes an important one, and I therefore propose to discuss it in a separate chapter.

CHAPTER VIII.

ANCHYLOSIS OF JOINTS.

Section I.

When considering the various terminations which may ensue as a consequence of disease of an articulation, the subject of anchylosis was alluded to, as being a result which might fairly be considered in a favorable light; it is true, that such an ending is at best a poor one, as it necessarily implies the destruction of the part as a joint; but, on the other hand, its presence indicates the arrest of the disease, and proves that nature's efforts have not proved fruitless in attempting to repair the condition of a part which has already ceased to perform the functions for which it was formed, by producing a result, which although but a poor substitute for a movable articulation, is yet a favorable one, and in the majority of cases when disorganization of the joint has taken place may be hailed with satisfaction.

But this opinion must not be taken in its literal interpretation; for, although anchylosis may be considered as a fortunate result after the suppuration

and disorganization of a joint, if the limb be fixed in a position favorable for the movements or occupation of the patient; when this is not the case it may prove most prejudicial, and, instead of an advantage, may become not only a constant source of anxiety but a genuine impediment to the welfare of the individual.

The term anchylosis is applied to any joint rendered stiff and immoveable, as a consequence of disease in any one of its structures; it depends essentially upon the organization of the fibrinous materials poured out during the inflammatory process, whether that material be deposited within or without the articulation; but occasionally it takes place simply from non-use, the parts which move the joint and the structures around becoming rigid, and losing both their natural structure and their functions from simple want of exercise. If the uniting medium is composed of bone, true osseous anchylosis or synostosis is said to exist; but if of any other less solid material, it is described as false, fibrous, or ligamentous.

Any one but slightly acquainted with the science of pathology will at once understand how such a result takes place. The fibrinous inflammatory product poured out in the meshes of the cellular tissue external to the joint, and surrounding the tendons and muscles of the part, organizes and gradually contracts, the muscles become fixed, and, consequently, unable to perform their functions, and as a

result, the articulation is rendered stiff and immoveable, false anchylosis having taken place.

When a similar material is effused into the articulation as a consequence of suppurative synovitis, whether the cartilages be destroyed or not, a somewhat analogous result ensues. The joint becomes as stiff and perhaps as immoveable by the organization of this inflammatory product; but the union will never become osseous, for to produce true bony union, the entire destruction of the articular cartilages is a *sine qua non*, together with the exposure and loss of the articulating surfaces of the bones; and such a change can only take place after acute suppuration and disorganization of the joint, whether that disease originated in the bones, cartilages, or synovial membranes.

If the heads of the bones, however, are extensively diseased, neither the ligamentous or osseous union can ever be anticipated; for, to produce either form, diseased action must have ceased, and the process of repair be allowed undisturbed to pursue its course; if carious or necrotic bones exist, such a desirable condition becomes impossible, and unless the source of irritation can be removed, the total and irreparable destruction of the part must necessarily follow.

Unless the joint can therefore be restored to its integrity, disease arrested, and mobility preserved, a stiff or anchylosed limb is the "next best" to be obtained; this can only be expected when diseased action has ceased, and where that disease has been

confined to the soft parts and surfaces only of the bones; and, in a previous page, I have given an outline of the principles which should guide the surgeon in his practice, to attain such a desirable result.

Where the cartilages have but partially degenerated and disappeared, ligamentous union is the form which may be looked for; and it is only when the cartilages have ceased to exist, and the exposed articulating surfaces have lost their smooth and healthy aspect,—the cancellated bone beneath having become exposed,—that in healthy subjects, and after a lapse of time, osseous union may be anticipated. This result may at times take place at once, the inflammatory product becoming osseous when first effused, and the exposed bony surfaces thus uniting—or it may be merely a secondary process, fibrous or ligamentous union being the primary condition, and this subsequently becoming bone. Bony union is not an unfrequent termination of diseased joint, although it is somewhat difficult to decide with accuracy by what pathological process such a result may be produced.

Having given thus briefly the process by which a joint may become anchylosed, and alluded to the different classes of cases in which such a result may take place, it may be well to consider the position of the joint as it is generally observed, when undirected by the hand of the surgeon.

As a rule which is tolerably constant, all joints, when inflamed or diseased, have a tendency to assume the flexed position; the hip will be bent upon the

pelvis, leg upon the thigh, forearm upon the arm; this flexion, in chronic or very acute cases, may proceed to such an extent as to produce absolute dislocation of the joint, and in the hip and knee such a condition is too frequent. This fact is so well recognised that various explanations have been attempted. Mr. Wickham, of Winchester, suggested in his old but valuable work upon disease of the joints, after the careful observation of many cases in which suppuration had taken place, that this abscess being invariably situated in the extensor muscles, their functions became impaired, and the flexors, as a consequence, were left to act without any antagonistic influence. The joint consequently became flexed, and if anchylosis followed, such would necessarily be its position.

It cannot be doubted that paralysis of the extensor muscles, as a result of suppuration in their structure, must have a considerable influence in determining such a flexed position of the limbs, but alone it hardly affords a sufficient explanation. When, however, it is remembered that joints naturally assume the flexed position whenever the synovial membrane is distended with fluid, as in such a position the greatest distension is allowed, our surprise must be considerably lessened, as by reason alone we should naturally expect such would take place.

A third cause may be assigned, and it is the most philosophical and the most rational. It is well known that the joints are supplied with such nervous

influence as they possess, by nerves which supply also the flexor muscles of that joint; it is also well known that irritation of one branch of a nerve by reflex action produces a similar action in the remaining branches. Under these circumstances, it can be easily understood how a diseased condition of a joint, acting as an irritant, causes a tonic action of all the parts supplied by the nerve which is thus excited; and as the flexor muscles happen to be supplied in this manner, flexion of the limb is the general position in diseased joint.

The probable truth of this opinion is also seen in the fact, that in an early condition of disease of a joint, these flexor muscles are as a rule, found rigid, and thus prevent mobility; this symptom alone indicating to the surgeon the probability that there is some irritation in the joint, and also pointing out to him an important point in practice, that rest of the articulation is an essential element of success, and one which nature herself thus indicates in its very early condition.

Section II.

Treatment.

It has with truth been stated that anchylosis of a joint may, after its disorganization, be regarded as a favorable termination, provided that the position of the articulation is such as is favorable either for the

locomotion or occupation of the patient. If this statement be correct, as I believe it is, the importance of well-directed and careful early treatment cannot be denied. In a previous page, when discussing the treatment of diseased joints, where such a result might be anticipated, the necessity of placing and fixing the joint in the position most favorable for the patient was seriously dwelt upon, and it requires therefore, in this place, no further elucidation. But in practice it is too common to witness cases of chronic disease of an articulation in a passive or curative condition, with the joint fixed and perhaps firmly so, either by the false, ligamentous, or osseous anchylosis, in any position but the most desirable. The thigh may be flexed at any angle upon the pelvis, and the leg upon the thigh, and the bones may be dislocated backwards, either as a whole or only partially. The elbow may also be fixed in any position but the most useful, and similar unfortunate conditions may be observed in any of the other joints.

Such cases can never come before the attention of the observing and conscientious surgeon, without exciting feelings of regret, and shame; of regret that the patient should be the victim of ill-directed and bad surgery; and of shame, that in these days a man practising his noble science should have been found so wanting in knowledge or practical skill as to permit a joint when recovering from disease to assume a position

which the most ignorant man must know would be injurious, and which but a little care or knowledge might have prevented.

In the present chapter I therefore propose to discuss the different plans of treatment which have been found useful, and which can therefore be recommended, in cases of stiff and anchylosing joints; giving the short outline of cases from my note-book as illustrations. But before doing so, perhaps it will be as well to answer the important question; Which is the position of the joint under treatment which may be considered as the best? And here let me again remark, that there must be exceptions to any rule which may be given, as in the many and various trades and wants of a large town the position of a limb which to one man may be injurious, to another may be the best; these cases doubtless are exceptional, still they do occur, and it will consequently be always a good rule to consult your patient upon the point, and to act accordingly. There can be no doubt that the best position for the majority of joints when fixed by anchylosis is the straight one, that is in a line nearly parallel to the body, and this rule applies with truth to the hip, shoulder, arms, and phalanges. The knee may be straight, or slightly bent; the elbow-joint is best fixed at a right angle, or a little more, and the ankle in a horizontal position. Such positions are, in the majority of cases, the best adapted to the different wants and convenience of

the patient, and it is to produce such results that the treatment of the surgeon should be directed.

In the case of a painter which is now under my observation, the straight position of the arm is the most valuable; and in another instance, of a turner, the knee was fixed at his request, at a right angle, this position allowing him to turn his wheel.

The treatment of this subject must be divided into two parts: The consideration of the first will include the largest class of cases, which are classed together under the name of false, fibrous, or ligamentous anchylosis; it is in these that the greatest benefit can be derived from treatment, and in which we can generally prognosticate a fortunate result. The second part will include those of true osseous anchylosis or synostosis.

In the discussion of this subject, it will be taken for granted that the disease of the articulation is in a stationary condition, and that all the efforts of nature are directed to produce a cure; if this is not the case, the treatment advised must be modified to the wants and symptoms of each case, although the principles applied must be the same in both.

When a joint is stiff and immoveable, as a result of inflammation of the cellular tissue external to the joint, from the binding down and rigidity of the muscles of the part, unless in a very extreme example, or in a bad subject, relief may undoubtedly be promised with tolerable confidence; if the tissues of the joint itself are sound, and the inflammatory

proeess is at an end, the aim of our treatment is to eneourage the absorption of the inflammatory product, and gradually, by passive motion, to restore the normal aetion of the joint.

In a ease which eame under my eare, in March, 1858, the benefit of treatment was most rapidly and efficiently demonstrated.

Case 22.—A man, æt. 19, presented himself to my notiee with suppurative inflammation around the elbow-joint; it completely surrounded the whole articulation, and the matter was let out by free ineisions; from this time he rapidly reeovered; the wounds healed in the course of two weeks, and I saw no more of him for two months, when he reapplied with his elbow fixed at a right angle, and quite immoveable. The parts around were indurated and very firm, the museles also being rigid. If I had not seen the ease in its early stage, I should eertainly have believed that the joint itself had been involved in the disease, and that genuine anehylosis was taking plaee; but being confident that all the mischief was external, I applied my remedies aeeordingly. With the view of obtaining absorption of the effused fibrinous material, and knowing the effeets of mereurials in produeing sueh a result, I ordered the eompound mereurial ointment to be applied daily, and to be rubbed into the part, the arm having been previously well soaked in a bath of hot water. This treatment was persevered in for one week with

marked advantage; the induration was considerably lessened, and with some force slight mobility was detected. In ten days more all external induration had disappeared, and mobility was considerably greater; the mercurial inunction was consequently given up, and the joint was ordered to be rubbed two or three times a day with some oily material, and to be bathed as usual. At the same time the joint was to be worked with slight force if necessary; and in one month, under this treatment, he had rapidly regained the use of the arm. In similar instances a like treatment should be adopted, and a favorable prognosis may generally be given. It is important that the early history of the case should be well understood, as such a favorable result could hardly have been expected, if the interior of the joint had been involved; and any other measures alone, such as forcible or even gradual flexion, would have been useless, if not injurious.

We will now proceed to the consideration of the cases of anchylosis depending upon the deposit and organization of fibrinous material within the joint; and when the joint, either by bad or no treatment, has been allowed to assume an unfortunate position.

As I have previously stated, the joint will generally be found flexed, and the bones frequently dislocated. The flexor muscles will be firm and rigid, and the extensors limp and wasted; the efforts of the surgeon must be directed to reduce the dislocated bones,

if possible, and to restore the joint to the position which is most to be desired. These ends may be obtained by several methods. The flexion or extension of the joint may be performed *gradually* by means of mechanical appliances, so adapted as, without producing pain, to reduce the dislocation, and direct the joint into its required position.

The same end may be obtained with force, and at one operation; the limb, when the patient is under the influence of chloroform, being forcibly moved and placed in the position which is most desirable, and there maintained by means of mechanical appliances. As an adjuvant to either method the operation of tenotomy has been recommended and employed. All resisting structures, whether tendons, fascia, or indurated tissue, being subcutaneously divided, and thus removing obstacles from the practice of the surgeon.

All these plans of treatment are of value in different cases; and, in deciding which method should be adopted, each case must be weighed by its own merits; where simple and gentle means prove sufficient, force and violent ones surely should never be employed; where a joint can be restored by simple mechanical appliances, the risk of exciting fresh inflammatory action by violence would not be rational; where moderate force will allow the joint to be replaced at once in its desirable position, the slow process of gradual extension would be equally exposed to blame. The operation of tenotomy must be

employed only when absolutely necessary; when slight force gradually applied is sufficient, it can hardly be required; and when moderate and sudden force will suffice the same objection may be made. But when the tendons of muscles are tense and unyielding, and the structures around the joint forbid any yielding except by the application of a power which must surely lacerate and tear, and which is almost certain to be followed by fresh inflammatory action, the operation is of great value; and it is in such that it should be performed.

Out of sixty examples which my note-book yields of partial anchylosis of the larger joints relieved, or rather cured by treatment, seven are of the hip, fifty-two of the knee, and one of the elbow.

In these cases all disease was at a stand still, and considerable efforts at repair had taken place, the joints, however, being unfortunately fixed at an objectionable angle. In the seven of the hip forcible extension was employed, as it was also in ten cases of the knee, and in the one of the elbow. In forty-one of the knee gradual extension was found sufficient, and in one only was division of the tendons called for.

The success which attended the above practice is a sufficient guarantee for its general adoption, and fairly proves that simple measures are sufficient in the majority of instances. In many of these examples there is no doubt that the disease producing

the anchylosis was confined to the exterior of the joint; in others it followed upon what was described as a rheumatic attack; in the majority of examples, however, old and arrested chronic disease of the joint was the evident cause.

To illustrate the treatment, I will now proceed to give a short outline of cases, taking examples from different joints, and shall commence by examples of forcible extension.

In all, the administration of chloroform was employed, and it is needless to dwell upon the advantages and importance of such an adjuvant; it diminishes pain for the patient, relaxes the muscles of the joint, and allows the surgeon to perform his duties with greater pleasure and efficiency.

Case 23.—The first case is one of old disease of the hip-joint in a child æt. 12, who, for ten years, had suffered from the disease. Copious discharge had taken place years previously, but, when admitted, a discharging sinus alone existed; the head of the femur was dislocated upon the dorsum, and from the history this had taken place about a year previously; the thigh was flexed upon the pelvis, and was but slightly moveable, partial anchylosis in this unfortunate position having taken place.

Chloroform was given, and moderate but gradual extension applied; the new tissues gave way most perceptibly to the operating surgeon (Mr. Cock),

and a long splint was applied. For two months absolute rest was enforeed, and at the expiration of that period the boy left the hospital with a straight but anehylosed joint.

The following ease is one of some little interest, and oeeurred after repeated rheumatie attaeks; the disease was evidently exterior to the joints, and in the ligaments and fibrous tissues; the synovial membrane and eartilages probably being sound.

Case 24.—A woman, æt. 42, had been the subjeet of ehronie rheumatism for twelve years, when young she had rheumatie fever, but felt no return till the period stated. During the whole of that time she had suffered repeated attaeks, with but slight intervals, the pains being prineipally in the hip-joints; from the first seizure she had never had the perfeet use of her legs, always experieneing mueh stiffness; but for about eight months after an unusually severe illness, the hip-joints beeame stiff, and she entirely lost all power to flex or move them; she was unable to sit down or even to stand, as the legs were some three feet apart; in this eondition she applied to Guy's Hospital; the legs were found three feet apart, and the hip-joints were very stiff; attempts to move them gave great pain, and movement was seareely pereeptible. Chloroform was given, and Mr. Coek, whose patient she was, brought the legs together without mueh diffieulty, at the same

time rotating the joints; the legs were subsequently tied together; some pain followed the operation, which soon subsided, and passive motion was employed; in ten days from the first operation she was able to flex and move the hips, and in a few more days to walk; from this time she rapidly recovered, and left the hospital with fair powers of locomotion.

I will now proceed to quote a few examples from the diseases of the knee-joint, in which like treatment was successful. (Case 25,) the first case, is one of old disease of the joint of seven years' duration, in a boy aged nine years; all signs of disease had long ceased, but the joint was flexed at an obtuse angle. Chloroform was given, and forcible extension employed; the parts broke down without difficulty, and no bad symptoms followed; the leg was kept in its straight position by means of splints, and the boy left cured. Having given an example of old disease producing anchylosis of the knee, the following example, of more recent character, will serve to illustrate the same treatment.

Case 26.—A woman, æt. 30, one year previously had been seized with acute inflammation of the knee-joint; it did not suppurate, but stiffness and perfect loss of motion—the joint being flexed at an acute angle—was the result.

Chloroform was given, and forcible extension em-

ployed with only a good result,—passive motion was subsequently insisted upon, and the patient left with a straight limb, and with slight mobility of the joint.

It is needless to quote other examples, although many might be given, as they all illustrate the same subject. In cases of stiff and anchylosed joint following suppuration of the cellular tissue external to the joints; in others, which are generally described as rheumatic inflammation, and in cases of disease of the joint of a recent character, there can be no doubt that forcible flexion, under the influence of chloroform, is the treatment which is most applicable and successful; in the two former classes of cases, mobility may generally be restored; in the latter this result may occasionally be produced, but it is not to be expected as a rule. In anchylosis also of the hip-joint, it may generally be preferred. The treatment by slow and gradual extension is most applicable to the knee-joint, and it there meets with most satisfactory results; in all cases of false anchylosis this treatment should be employed, and the apparatus must be adapted to the peculiarity of each case; when flexion alone is present, and dislocation has not taken place, a posterior angular splint with a joint situated in the popliteal region, and moveable by means of a screw, is the simplest, and as a rule answers every purpose. It should be bound firmly to the leg and thigh, and the screw daily turned, in

order to bring the leg to the right position; by these means, persevered in for some months, a good result may generally be obtained.

In other cases, when dislocation of the bones has taken place, the instrument just recommended is not enough; in slight examples it may be of benefit, but too frequently it fails to fulfil all the wants of the cases. The ingenuity of instrument-makers has suggested various forms of splints; the one with which I am most conversant, and which appears to answer every purpose, is one invented by Mr. Bigg, of Leicester Square. It consists of lateral splints and elastic bands, so adapted as to apply their constant force in two opposite directions; in the thigh it always acts so as to press the femur backwards; and in the leg, to bring the tibia and fibula into the required forward position. It is a most ingenious and valuable instrument, and in old cases, or in recent, when dislocation is present, it is invaluable; it may be employed in the former class of cases, and is just as useful, but the cheaper splint is one which generally answers every purpose.

In a former page, I asserted that the operation of tenotomy might be occasionally required; like all other operations it has its powerful advocates, and, perhaps, like others, it has been too much condemned. I am not disposed to side with either party, neither generally recommending or condemning its use. In the larger number of instances my experience has been to show that it is not often re-

quired, simple or forcible extension answering every purpose, no bad result having followed in either case. Under these circumstances, where simple measures are sufficient, surely it becomes unnecessary to add, that any extra means should not be employed; for operative interference, which is not absolutely demanded by the exigencies of a case, may be rightly condemned, and such practice may be classed with meddlesome surgery.

It cannot be denied, that in certain examples, the operation of tenotomy is not only of immense advantage, but becomes absolutely necessary. In cases of old disease of the joint with anchylosis, where simple and gradual extension would be fruitless, and where the force required to bring the limb to the desired position by one operation would be very great, if not useless, the simple operation of subcutaneous section of all resisting structures should undoubtedly be performed; it may certainly be selected in other cases, where it is the intention of the surgeon to reduce the limb to the right position at one operation, when the force required would be at all severe. Each surgeon must judge for himself as to the meaning of severe force; but, if by the employment of the power of an average man, the new structures break down by its moderate exertion, little harm, but much good, may be expected; if great force is used this is not the case, and it is better, in such examples, to employ tenotomy, than to run any risk as to the successful termination of the case.

I am aware that its advocates, who not only employ it, but advise its use in almost every instance when any difficulty is experienced, may ask, Why make an objection to a practice, which they affirm never does harm? My answer to such would be, that it is not necessary, as equally good results can be obtained without such operative interference.

In the large class of cases which I have given where simple measures are not sufficient, tenotomy is a most valuable operation, but it is to be regretted that the operation may be brought into disrepute by its own advocates employing it in cases where such a practice is open to dispute; let it be confined to the cases previously described, and to others of old dislocations, and none will raise a voice against it; but when it is advised as a general means, and where simpler means will suffice, the condemnation of such practice should be expected.

The following case will serve as an example:

Case 27.—A child, æt. 10, was admitted with anchylosis of the right knee-joint; the leg was bent at a right angle, and the muscles quite rigid and inextensible. It had been in that position for four years, the joint having been diseased for a year previously. Mr. Hilton, the surgeon of the case, finding that moderate force would not be sufficient to bring the leg down, and that a greater power would do more harm than good, even if it succeeded in extending the leg, divided the hamstring muscles

by a subcutaneous incision, and brought the leg down nearly to a direct line; a posterior screw splint was applied, and perfect rest enforced; no bad symptoms followed, and the child left the hospital five months after with the leg fixed at only a very obtuse angle, well able to walk.

We now come to the consideration of the second class of cases, that is, where the joint is already truly anchylosed, the line of union being bone. When such a result has taken place, and the joint is in a favorable position, nothing can be required, as nature has done her best, and restored the limb to the use and care of the patient; much care is, however, required, as any injury which may set up anew inflammation of the part is likely to be followed by bad results, and, in one instance which came under my observation, and which I will here quote, a subsequent separation of the parts took place, and amputation was performed.

Case 28.—E. W—, æt. 53, a healthy looking woman, twenty-seven years previously fell upon her left knee; disease of the joint with suppuration followed, and after a residence of three years in Guy's Hospital and the Margate Infirmary, she recovered with a stiff joint. For the twenty-two years following, the limb had been to her a useful member, the only inconvenience experienced being that arising from a stiff joint. Two years ago she received an injury

to the knee from the butting of a calf. Inflammation and suppuration followed, succeeded by the softening down of the new structure, and disintegration of the joint. In this condition she was admitted into Guy's, under Mr. Hilton, who amputated the limb on January 24, 1856. Upon making a section of the joint, the surfaces of the tibia and femur were evidently excessively vascular. No signs of cartilage were visible, and the bones and muscles were found much degenerated. The patella was firmly anchylosed to the femur with true bone, and the surfaces of the tibia and femur were intimately adapted to one another; the spicula of bone upon one surface corresponding most correctly (suture-like), with the depressions upon the other. These appearances, together with the fact that for twenty-two years perfect use of the stiffened limb had been enjoyed, renders the opinion that osseous anchylosis had taken place more than probable. At any rate, it is well demonstrated that the new product enjoyed less power of resistance to the inflammatory action, as the blow proved sufficient to induce its destruction or decay.

Such a case is no doubt a rare one, still it may occur, and although disease attacking an anchylosed joint may not always be followed by a like result, less disease will be followed by the loss of the functions of the part, and consequently become of some importance.

When bony union, however, has taken place, and the joint is in a position detrimental to its owner, the advice and operative interference of the surgeon is not unfrequently demanded; such cases are painful to witness, as they are a reproach to the skill of the surgeon, and too often make him feel the inefficiency of his art.

If the hip is the offending joint, nothing can be done, as few surgeons would advise the rupture by force, if it could be done, of a bony anchylosis; and any other treatment is inadmissible. If the position of the knee or elbow be such that it renders the limb of the patient useless, there are two operations to select from, amputation or excision. If other joints are the offending members, each one must be weighed upon its own merits; when excision can be performed with a chance of benefit, it should be selected; if otherwise, amputation should be performed; but many general and local considerations are to be remembered, and must influence a surgeon in forming his opinion. The parts should be left alone if possible; if otherwise, save the joints where there is a chance; if not, the obstacle must be removed; but as I have previously stated, such cases should not take place; they can always be prevented, by moderate care and consideration upon the part of the surgeon. They are produced by neglect or ignorance, and let us hope, as the education of our medical brethren improves, such an opprobrium to our art will not be seen.

Bony anchylosis is said to be most frequent in the hip, ankle, and wrist-joint; and less so in the elbow, knee, and shoulder; being very rare in the latter. This is, perhaps, no more than would be expected if the comparative frequency of disease of the different joints be considered, and the different surgical treatment which is adopted in each.

Disease of the hip and knee are about the same in their order of frequency,—the latter, perhaps, being the most frequent; disease of the elbow and ankle are about equal; about one case of each taking place to four of the hip- or knee-joints. Diseases of the wrist are less common, being only about four per cent. of all cases; and diseases of the shoulder not more than one per cent. Under these circumstances, it is not difficult to understand why anchylosis of the different joints should present such differences in their order of frequency.

Diseases of the hip are also left to nature to cure, assisted only by the means of art; as a consequence, bony union becomes tolerably frequent; in the diseases of the knee-joint, excisions and amputations considerably diminish the chances of bony anchylosis, consequently such pathological specimens are somewhat rare. In the elbow and ankle they are as common as are the diseases of these articulations, although operative interference in the former considerably diminishes the chances of obtaining such a result.

No one can doubt that if all things were equal,

and every joint had the like chance, that in an equal proportion in each, bony anchylosis would take place; but this can never be, and consequently the discrepancy in numbers must always exist.

CHAPTER IX.

AMPUTATION OR EXCISION.

When a joint has become disorganised, and all hope of its reparation has passed away; when the irritation produced by the disease, and the demand upon the patient's powers by the purulent discharge is so great, that it becomes evident to the surgeon that by some operative measure the source of the irritation must be removed; the serious question addresses itself to his mind of—What operation shall I select? It is not my intention to write a lengthened chapter upon amputation of limbs, or upon the excision of joints, I leave that to the many advocates of either operation. But in a clinical work like the present, it becomes necessary to discuss, although briefly, the two operations; and to indicate, as clearly as I am able, the cases in which operative interference may be required, and the operation which is to be selected in each. And, indeed, there are few questions which address themselves with greater force to our minds, or which demand more anxious and serious thought. Unfortunately there has been so much party feeling in the consideration of both operations, and the advocates

of each are so strong in their advocacy, that it is to be feared joints have been occasionally condemned, where simpler means would have induced a cure, and that the useful operation of excision has lost repute, by its application to inappropriate cases. But, before I enter upon the question of operative interference, it will not, perhaps, be out of place, to preface my remarks by briefly considering the efforts and powers of nature in the cure of disease, as exemplified more particularly in joints. Every surgeon must be able to recall cases where disorganization of a joint had taken place, whether from disease of the synovial membrane, cartilages, or bones, where the question of amputation or excision had been suggested; and which the patient or his friends had positively refused, and where, to crown all, a recovery had taken place. I do not mean a recovery or restoration of the joint as such; but where the diseased action had become arrested, and the limb had become an useful one, by false or true anchylosis.

Such cases must have passed under the observation of most surgeons; and they tend to impress upon the minds of all who are disposed to learn the important fact, that nature alone, or when but feebly assisted by art, has immense power to subdue disease, and to restore an articulation to a useful condition.

By trusting too much to nature, the moment for operative interference may pass away, and the life of a patient may, perhaps, occasionally be placed in jeopardy or lost; but, by trusting too little to her,

and by relying too much upon operative measures, there can be no doubt that greater injury ensues; not only by risking the life of the patient by the operation, but by rendering that life less valuable, and perhaps more burdensome, by depriving him of a limb.

Relying, then, with much confidence in the powers of nature to cure and arrest disease; and assisting her by all the general hygienic and surgical means which our art can so well supply; let the subject of operative interference now claim our serious consideration. Assuming, as a fact, that the joint has become so disorganised, that by attempting to preserve it the life of our patient would be in danger; and that the disease is too extensive for any natural cure to take place; there can be no doubt that some surgical operation may be demanded, for the source of the mischief must be removed.

If the diseased joint should be the shoulder or elbow, and if there is a chance of removing the disease, and thus of preserving the extremity and hand, there is no doubt, amongst surgeons, that the operation of excision should be preferred. Such an operation as amputation for disease of a shoulder or elbow-joint should be regarded as being almost out of all question. The operation of excision is generally successful, and, although many months may perhaps pass away before the true benefit of the operation has been proved, the importance of the hand is such, that time becomes of little account in

the cure, where subsequently it may be saved. At Guy's Hospital amputation for diseased elbow joint is so rare, that in five years but one case has taken plaee, and, in the same period, eight excisions of the elbow have been performed, with one death, and with one subsequent amputation; in the remainder a good arm was preserved. When, however, we approaeh the consideration of the operation of excision as applied to the joints of the lower extremity, we find that the different purposes for which they were formed render the value of the joint or limb considerably less.

The value of a hand is so great that almost all risks are worth running if a chanee of saving it can be entertained; it is the one great instrument of an intellcctual being, and without it the benefit of that intellect must be materially diminished; it has a psychical relation to its owner which marks its own peeuliar value. With the lower extremities a different condition naturally exists; they are simply pillars of support, and are purely meehanical powers of progression. Doubtless they are far above all others in their value and perfeetion, still they can be dispensed with without entailing such a loss to their owner as is experienced by the loss of an upper extremity.

The risks that are worth running to preserve an upper extremity beeome then comparatively less justifiable when run to preserve a lower; exactly in the samc proportion as the arm or hand is of greater value than the leg.

If then by the operation of exeision of the knee-

joint the dangers to life are greater than in amputation, and as the advantages gained by preserving the limb are not so great as to cover this extra risk, the propriety of selecting amputation cannot be questioned.

I do not doubt that there are select cases where excision of the knee-joint may be most advantageously employed, as there have been many excellent examples to prove; but I do not believe that the operation will supersede amputation and be employed as a substitute. In cases of very extensive disease of the bones of a joint, excision could not be applicable, as the whole of the disease would not be removed. Nor is it in other instances of disease of a joint when amputation is performed simply to remove a source of extreme pain and irritation from a patient suffering from some tubercular affection; or from another in which it becomes a question whether the powers are sufficient to bear up against any operation. In the cases best adapted for excision, that is, where the disease is confined to the articular surfaces of the bones, a cure by ordinary surgical means can fairly be expected, without any operation of any kind; and in other instances of disease of the synovial membrane, either of the pulpy or gelatiniform character, in which the bones are only superficially exposed, the operation does not offer great advantages. The class of cases in which it promises to be most useful, is that in which the disease has originated in the articular extremities of the bones; and, as a

result, a partial death of the bone has taken place, the sequestrum by its presence keeping up the irritation, and thus preventing a natural cure. In such examples, the removal of such a source of irritation by the operation of excision, cannot but prove of value; and when such a condition is in existence, if other general causes do not militate against the practice, the operation may be performed. There may be other instances when a like operation might prove of value, but in cases of disease the class of cases just mentioned appears to be the most favorable.

In a paper which I have read before the Medical and Chirurgical Society, and which is to be published in this year's volume of their 'Transactions,' I demonstrated that the deaths from amputation of the thigh, including these two last specified classes of cases, was about one in seven, and this is the least favorable view of the operation. Mr. Butcher and Mr. Price, avowed advocates for excision, give the fatality of excision of the knee as one in five, and this shows the most favorable aspect. In the hands of some experienced surgeons the fatality has been more than half. Unless, therefore, the advantages to be gained by preserving the leg can be proved to be so great as to counterbalance this great difference in the risk of the operation of amputation, as performed in a large London hospital, I think it will be difficult to prove that the operation of excision should as a rule be preferred. At the same time I would add, that in select cases there is

no doubt that it should be performed; and that as time progresses, and more experience is acquired, the operation will become less fatal, and, consequently, more frequent.

Excision of the hip-joint is not suggested as a substitute for amputation, as such an operation is never performed for disease of the articulation, but comes before us as an extra means of affording relief in these painful cases. There is, however, this serious disadvantage, that both surfaces of the articulation cannot be removed. It is very rare for only one surface of a joint to be diseased, even in an early stage; and in such a condition where the joint has become disorganised, there can be no question that both surfaces will be involved; no means that we possess will inform us in which bone or upon what surface the disease is most extensive, nor can we learn what part is capable of repair. The great advocates for excision of joints dwell forcibly upon the rule of practice, which they hold out as the chief cause of success; that the removal of all the articular surfaces of the joint is a *sine qua non,* and that the section of the bone should be a liberal one. In the hip-joint this rule cannot be carried out. The pelvic portion of the joint can be but little interfered with, and can certainly not be removed; and one portion, therefore, only of the joint, viz., the head of the femur can be excised. Under these circumstances, there are not many instances where much benefit can be ex-

pected, and as a consequence the operation of excision should not be performed.

There are examples of acute and chronic inflammation of a joint terminating in necrosis, where the necrosed bone by its presence keeps up irritation and suppuration, and where good can be expected by the removal of the dead bone; in such, the bone may be removed, or such portion of it as will come away. But surely these are not cases of excision of a joint. The dead bone is keeping up the disease, and by its removal, if the disease is not arrested, benefit may fairly be expected.

There are other cases of hip-disease in which all treatment appears useless, where the hope of procuring an anchylosed limb is very slender, and where, by the pain and irritation of the disease, the powers of the patient are yielding rapidly; in such, an exploratory operation may be justifiable and may prove of benefit. Cases of recovery are recorded after such an operation, and others where much relief has been obtained; and although the chances are against success, in such rare and desperate cases, when all other hope has vanished, the attempt should be made. Still, experience teaches us that by absolute rest of the diseased joint, with tonics and sedatives, it is wonderful what nature will do in very severe cases, and it requires only perseverance to obtain a satisfactory termination. The cases which fail are very few, if fairly treated. Much time and much patience must be consumed by both

surgeon and patient, but neither must be too closely calculated to obtain success.

When disease has so disorganized the wrist-joint as to forbid hopes of its recovery, and if the hand and tendons which move the fingers are not so involved as to forbid any hope of preserving them for the use of the patient, and if the carious or diseased bone can be removed with a fair chance of preserving their integrity, it is needless to say such an operation should be performed. But, unfortunately, it is rare for disease in a wrist to proceed to the disorganization of the joint without the tendons becoming so matted and bound together by inflammatory product that the functions of the hand are lost, without much hope of their recovery. Under such circumstances amputation should be performed.

When the ankle-joint is disorganized, I am unable to find any advantage in excision; if a stiff joint ensues, the foot is dreadfully in the way, and the chances of obtaining a moveable one are very slight.

The removal of the foot by a Syme's or Perigott's amputation is, as a rule, so satisfactory that a patient progresses far more comfortably upon such a stump than he would with a shortened leg and anchylosed ankle; and, indeed, amputation of the foot above the ankle appears to leave the patient in a more favorable position than the operation of excision possibly can by leaving him with a stiff joint. There may be exceptional instances, where the preservation of the foot is of great importance. In

sueh eases the surgeon is bound to take the subject into consideration, and to act accordingly. But I do not believe that the operation of exeision of the ankle-joint will beeome general, or that it will confer the advantages whieh its advoeates would lead us to believe.

In disease of the tarsal joints, depending upon diseased bone, the removal of the diseased portion should be earried out whenever practieable; if the disease is too extensive, involving the majority of the tarsal joints, the operation adopted by Chopart. and still known by his name, should be performed, and in the larger proportion of cases an admirable stump remains; the subsequent division of the tendo Achillis is generally required, and upon the whole it is a most successful and satisfactory operation. A foot, however, should be eondemned only after all minor measures for its restoration had been found to fail, for the removal of diseased tarsal bones is as a rule attended with satisfactory results, and sueh chances should be given before amputation is performed. Both tarsal and metatarsal bones have been removed singly with good results, and with sueh experienee a like fortunate termination may be anticipated in select eases.

CHAPTER X.

LOOSE BODIES IN JOINTS.

In the following chapter I propose to discuss the subject of loose cartilages in joints, and also of other loose and pendulous bodies. They all give rise to the same symptoms, and are probably developed in the same manner, the loose cartilages being merely the pendulous bodies freed from their pedunecular attachments. It is now generally believed by pathologists that these pendulous bodies are developed in the subsynovial cellular tissue, that as they increase in size they encroach upon the cavity of the joints, pushing before them the synovial membrane, and that in this condition they may remain. Upon the examination of a joint thus affected, these bodies will be seen as fibrous or cartilaginous growths, hanging from the synovial membrane into the joint; they may be single or multiple, and the different museums contain many very beautiful specimens of this peculiar affection. If one of these bodies in any way becomes detached, it is called a loose cartilage, and as such will be treated of in this chapter. Some of these loose cartilaginous

bodies are said to originate in a different manner, and to be composed of coagulated fibrine, this fibrine subsequently contracting and forming a hard laminated and fibrous structure. They are covered like the others with a smooth and delicate membrane, and are said never to contain any cartilaginous or bony structure. The ordinary loose cartilage contains at times ill-formed cartilage-cells, and very frequently becomes bony, Mr. Rainey describing true bone-lacunæ as being present. They may be of any size, varying from that of a hemp-seed to a walnut; they may be oval or elongated, round or bilobed; some are smooth and even, and others may have pedunculated bodies upon their surface. Sir B. Brodie has described several cases where fleshy, fibrous, pedunculated growths were found in the knee-joint, and excised, having been mistaken for false cartilages. They probably originate in the same manner, the new product in the cellular tissue passing on to form a fibrous, instead of a cartilaginous, structure.

All these loose or pedunculated bodies, however, give rise to similar symptoms. They are sometimes traced to a previous attack of inflammation of a joint; in other instances they show themselves after a strain. In many cases, however, no cause can be assigned, and it is more than probable that they are new developments, which follow their own laws, and do not depend upon any of these usually assigned causes. They may certainly be discovered after one

of them but it appears more probable that the sprain or inflammation of the joint is the result of the presence of the cartilage, and its malposition, the cartilage during walking or some movement of the joint becoming fixed and pinched between the articular surfaces of the bones. It is generally discovered accidentally by the patient, after walking or moving the joint; its presence being indicated by the sudden inability to move the articulation; this immobility of the joint being attended with a severe and sickening pain, which is at once relieved upon the cartilage slipping from between the bones, as indicated by the snap. Some stiffness and slight inflammation of the joint may follow this injury to the new growth, which will subside in a few days by rest and other treatment, again only to be renewed upon a recurrence of the accident. If the patient has not discovered the cartilage himself, the symptoms as just given are sufficient to lead the surgeon to diagnose the cause of the joint-affection and the presence of the loose body; the symptoms being most characteristic.

The disease is by no means an uncommon one, about thirteen cases having taken place in Guy's Hospital within the last five years; twelve of these were in the knee, and one in the elbow-joint. In two of these the cartilages were removed without a bad symptom; in a third an attempt was made, but the cartilage slipped away; in the remaining ten palliative treatment was alone employed. And these

facts lead us to the consideration of the treatment which should be pursued when the presence of a loose cartilage or pendulous body has been fairly diagnosed.

The treatment may be divided into two different methods—the palliative and operative. By the former the cartilage is left untouched in the articulation; by the latter the cartilage is removed or fixed in an unoffending position. As a rule, the palliative treatment is the correct one to be enforced; for knowing how destructive inflammation of a joint following a wound too often becomes, few surgeons would venture upon an operation without an absolute necessity, and such seldom exists. If the movements of the joints are restrained by means of strapping or an elastic bandage, or if the loose body can in any way be fixed by the same means, any injurious effects will seldom be experienced. If the cartilage should be occasionally pinched between the extremities of the bones, and, as a consequence, some slight synovial inflammation should take place, rest, and the application of cold lotions or blisters, with a mild purgative, are generally sufficient to allay it. If these mild measures are enough, any operative interference is certainly not required, as it is not justifiable for any surgeon to submit his patient to the risk of an acute inflammation of a joint by making a wound, whether subcutaneous or otherwise, into the synovial membrane, unless an absolute necessity exists; and if such palliative measures as

just mentioned suffice to prevent any serious inconvenience being felt from the presence of this foreign body, such a necessity is not present.

On the other hand, should the presence of these loose bodies produce such serious inconvenience that the use or value of the joint is entirely destroyed—as much, perhaps, from the dread of the sickening pain which follows upon the pressure of the cartilage between the articular extremity of the bones, as from the inflammation of the joint, which is too often the result of such an accident—in such a case operative interference becomes not only justifiable, but absolutely necessary; the joint, as such, is useless to the patient, and if it should be the knee, mobility in walking may be impossible. Under such circumstances some extra risk is justifiable, and an operation should certainly, after due consideration and the full explanation of its risks to the patient, be carefully performed.

Such an operation as a direct incision upon the tumour, in order to remove it, is now never performed, as a simpler practice yields equal benefits, and is unattended with equal risks. In the present day a subcutaneous incision is the right one to be employed; the cartilage is moved to a superior position in the joint, where it is most easily got at, and there held or fixed; with a small knife entering the integument at some short distance from the cartilage, the synovial membrane and fascia covering the cartilage are divided, the cartilage having been pre-

viously fixed by a tenaculum passed freely into its substance; by a little manipulation the cartilage may then be tilted out of the joint into the cellular tissue external to it. A pad of lint should then be strapped over the wound and pressure applied, the limb being preserved in absolute repose by means of a splint.

If care be taken in the execution of this operation a perfect cure may ensue, and no bad symptom show itself. If any signs of inflammation should appear, cold irrigation, cold lotions, leeches, and other remedies, as applicable for synovitis, must be sedulously employed; and even this may be subdued, and a good recovery take place.

Occasionally, however, all remedies appear to fail, and inflammation or suppuration, with disintegration of the joint, will be the result.

When the cartilage has been removed from the joint, and is quietly imbedded in the cellular tissue external to it, it may subsequently be removed by a second operation, when the wound into the synovial membrane has evidently been repaired. Or if this is not advisable, from the position of the part, it may be left alone, or a blister applied over it, which will tend to fix it, and will also hasten its subsequent absorption. With a knowledge of this fact, and upon this principle, Mr. Syme has become the advocate of a form of practice, which, although I have not tried or seen carried out, appears to offer great advantages, for it is satisfactory to know, says

Mr. Syme, "that complete and permanent relief may in most cases, if not always, be afforded, by bringing the cartilage into a part of the joint where it can be retained by external pressure, and where the coverings are thin; then making a free subcutaneous incision through the synovial membrane and the cartilage, and finally applying a small blister over the part. By this process the body becomes fixed, so as no longer to cause annoyance, and soon undergoes absorption, partial or complete."

The above practice is strongly recommended, and should certainly be employed in cases well adapted for it. It is not always an easy task to fix the cartilage for any lengthened period in one position, but where such can be done the operation commends itself to our consideration. The operation previously advocated differs but little from the latter in the early steps, and it has this advantage, that the cartilage is removed from the articulation without requiring a larger wound into it than Mr. Syme's. Should, however, difficulty be experienced in taking the cartilage out of the joint into the cellular tissue, it is satisfactory to know that other means may be employed, which offer a fair chance of obtaining a like end, namely, the absorption of the loose or foreign body.

I will now proceed to give some few examples taken from my note-book, which will illustrate the value of operative interference.

It would not be difficult to quote examples of

acute synovitis from the removal of a loose cartilage by means of a direct incision. I have several such cases before me; but as such a practice is now obsolete, and would never be performed by surgeons who are aware of the simpler and equally efficacious operation, it is unnecessary.

As examples of the subcutaneous operation, the following cases will be read with interest.

Case 29.—T. S—, a healthy labourer, æt. 38, after a strain, discovered a loose body in his right knee-joint, the size of a walnut; at this time the joint was swollen and very painful, and he was quite unable to follow his employment. When attempting to move the limb, the cartilage slipped between the bones, and not only for a time prevented the movement of the joint, but was followed by fresh accession of pain and swelling. He obtained relief during any one of these attacks by flexing the limb; but as they occurred so frequently, he applied to Guy's.

As it was evident the presence of this loose body totally incapacitated the man for work, Mr. Hilton, the surgeon of the case, fixing the cartilage upon the inner and upper part of the articulation, made a subcutaneous incision over and into it, the cartilage at once escaping into the cellular tissue. The limb was preserved at rest by a posterior splint. A pad of lint was applied over the wound, and a blister over the escaped cartilage. No bad symptoms followed. Upon the sixteenth day the cartilage had

much diminished in size, and in another month it had nearly disappeared, when the man left cured.

Case 30.—A man, æt. 22, after a sprain, discovered a moveable tumour in the right knee; it at times produced severe pain and swelling of the joint, and considerably interfered with his avocation as a labourer. Mr. Birkett, under whose care he was admitted, finding that the tumour could be easily fixed upon the upper and outer ends of the articulation, determined to remove it. Having brought the cartilage to the required position, and having fixed it with a tenaculum passed freely into its substance, a subcutaneous incision was made over and into it; attempts were then made to tilt the cartilage out of the joint into the cellular tissue external to it, but in so doing the instrument slipped; the cartilage was then fixed by pads and strapping in its position, and the limb preserved at absolute rest. No bad symptom appeared, and upon the twenty-first day afterwards the cartilage was removed. No synovial fluid escaped, nor were there any indications of opening the joint, which had probably been closed by the former operation, the cartilage being found in its new position. Everything went on well, and the man left cured.

CHAPTER XI.

INFLAMMATION OF THE CELLULAR TISSUE EXTERNAL TO THE JOINTS, AND BURSITIS.

Section I.

The above diseases have been included under one heading, as I have every reason to believe that the former is generally but a sequel of the latter, and that the inflammation of the cellular tissue external to the joint is most frequently an extension of the inflammatory process from one of the well-known and superficial bursæ.

It is undoubtedly true that such a connexion cannot always be traced, and I believe that in some cases no such really exists; but as the progress and symptoms of both cases, and the treatment of each are so similar, it simplifies the subject to consider them together.

When acute inflammation attacks the cellular tissue of a part, whether the result of a blow or any other injury, suppuration generally ensues; the purulent secretion rapidly percolates through the

neighbouring cellular membrane, exciting fresh inflammation, and when this takes place about an articulation it is not an unfrequent occurrence to find it completely surrounded by a bag of pus, entirely covering in every point of bone, and producing intense local pain and constitutional disturbance, rapidly relieved only when the pus has found or obtained an exit.

On the other hand, when from a blow or fall acute inflammation attacks one of the superficial bursæ, as the one over the patella or olecranon process, suppuration rapidly ensues; the dense integument covering these bursæ prevents the purulent contents making its way externally, consequently it has a tendency to spread laterally, involving the loose cellular tissue external to the joint, and in neglected cases passing backwards into the popliteal region, or into the flexure of the arm, and surrounding the whole articulation in one superficial abscess.

In some examples, the suppuration is confined to the bursæ; in others it extends, involving the cellular tissue of the joint to various extents. In some cases it commences in the flexure of the joint, as popliteal region, and may then, as a rule, be attributed to some strain or injury producing inflammation of the absorbent glands, and from them spreading to the cellular tissue, and passing upwards to surround the joint; but, as a rule, the original seat of the disease can be traced to the superficial bursæ, the inflamma-

tion and suppuration radiating from these well-known points.

The severe cases of suppuration surrounding a joint are most frequently met with in children of delicate and weakly frames, in children who, by bad feeding, are disposed to the rapid extension of suppurative inflammation, when started by any slight accident, as a blow, fall, or strain. It is not uncommon to find these large abscesses around the shoulder, a joint which is less liable to disease than any other, but in children it is frequently the seat of the suppurative inflammation of the cellular tissue extending to the articulation, produced, I believe, by some strain or injury when the child is dragged along by a careless or violent companion.

Around the knee-joint also in children is a like disease frequently witnessed, the suppuration in these generally commencing in the popliteal region, and from thence passing upwards to surround the articulation. But in adults this suppurative inflammation generally proceeds from the superficial bursæ, and passes backwards to surround the joint. The diagnosis of these cases is not difficult; by a careful examination it will soon be seen that the disease is entirely external to the joint; the well-known points of bone are covered in by the purulent secretion, and fluctuation will generally be present.

The joint can be slightly moved by care without giving pain, which would be impossible if the seat of the disease was in and not around it.

There is only one form of treatment which is of benefit, and which affords immediate relief, and that consists in giving free exit to the pus. Let a liberal incision be made into the abscess, and in the most dependent position, so as to allow the pus easily to drain away; let the limb be raised, and the joint preserved at rest by pillows or splints, and keep warm applications as poultices constantly applied; let the powers of the patient be kept up by tonics and liberal diet, and a speedy recovery will, as a rule, ensue. If, however, a free exit to the pus is not permitted, the abscess may make its way into the joint, and its rapid disorganization will take place.

There is an extensive bursa situated beneath the extensor muscles of the thigh which is not unfrequently the seat of acute or subacute inflammation; when such takes place there is sometimes a difficulty in forming a correct diagnosis; the cavity becomes distended with fluid, encroaches upon the knee-joint, and gives the appearance of effusion into the articulation. In subacute cases the diagnosis may generally be made, if some care is taken in examining accurately the position of the swelling; it will be found situated beneath the extensor muscles, and will, when large, bulge or project upon each side of the tendon of the rectus muscle, it will extend some distance up the thigh, much higher than any synovitis, but will not project downwards below the middle of the patella. It is true that it may elevate that bone, and by so doing produce the appearance

of effusion into the articulation, but in synovitis the fluid will gravitate when the leg is in a dependent position to the lower portion of the joint, and cause a projection on each side of the patella and its ligament; in effusion into the bursa this will never take place.

The mobility of the joint will be perfect, and except in acute cases of inflammation of the bursa mere stiffness of the articulation will be the only symptom. In acute cases suppuration will occasionally take place, and some care is required to form a correct diagnosis, as it is a serious error to mistake this affection for disease of the articulation, particularly for acute disease, as one is readily amendable to treatment, and the other is a serious and dangerous disease.

The following case most admirably illustrates the subject.

Case 31.—A cachectic and emaciated man, æt. 41, came before my notice amongst the out-patients at Guy's Hospital with an enormous enlargement of the right knee and thigh. The parts were much inflamed, and were discharging from orifices upon the inner side of the knee-joint above the line of the patella, and also from an opening in the middle and outer third of the thigh. The limb was in a straight position, and any attempts to move the knee produced severe pain. He had had a swelling about the knee-joint for four years, and had been in several hospitals. Six weeks before

my seeing him an abscess formed, and had since been discharging freely.

He was at once admitted into the hospital under the care of Mr. Birkett, and a careful examination of the leg made.

The enlargement of the thigh extended from the knee-joint upwards, for about two thirds of the femur; the integument was inflamed, and large tortuous veins meandered over the whole; to the hand the enlargement gave a soft and somewhat elastic feel, and when pressure was made air escaped from the discharging sinuses. Any attempts upon the part of the patient to move the knee-joint excited severe pain, but when the knee was flexed slightly or moved by the surgeon none was experienced. The bones moved freely upon one another, and it was tolerably evident that the joint was sound, as it would have been impossible for such disease to have involved the articulation, and not to have been evident when the joint was moved.

It was tolerably clear that the inflammation and suppuration was confined to the large bursa situated beneath the extensor muscles, and appropriate treatment was accordingly carried out. Rest and warm fomentations were at first employed to subdue the inflammation of the part, and the openings were enlarged. After two weeks the leg was placed upon a posterior splint, and moderate pressure applied by bandages over the whole thigh, leaving exposed the discharging orifices. Tonics and liberal diet were

employed. The cavity of the bursa gradually contracted and the discharge became less, pain ceased, and the man's health improved, although it was somewhat retarded by occasional attacks of erysipelas of the face.

In two months the thigh had almost regained its normal size and condition, he could walk tolerably well, the knee being quite sound, and at the end of the third he left convalescent.

In this example, on a superficial examination, the joint appeared to have been the seat of the disease, and it was only after some care that a correct opinion was arrived at. The treatment applicable to the two classes of cases is so different that it is needless to point out the great importance of forming a correct opinion. The example given illustrates the difficulty of forming a correct diagnosis and the advantages of the treatment based upon it.

Acute suppuration of the bursa over the patella and its ligament is a very common affection; and it must be so well known to surgeons that any lengthened description of such a case would be tedious and unnecessary. The recollection of the fact that such natural bursæ exist goes a great way to prevent any mistaken diagnosis; and, again, that the swelling and suppuration is situated over and covering the bones, tolerably clearly indicates that the disease is external to the joint. If the history is inquired into, it will generally be found that the inflammation of the part

followed some blow or injury, and that there are no symptoms which indicate disease of the joint itself. It is true, that mobility of the articulation may be painful, and that it is in some severe cases impossible, but by attending to the history of the case, and position of the swelling, and by remembering that such bursæ naturally exist and are liable to inflammation, a mistake in diagnosis can hardly be made. A free incision is the only correct treatment, followed by warm and moist applications, as a poultice, the limb being preserved at rest in a somewhat elevated position.

I have before me the notes of seventy cases of acute suppuration of the bursa situated over the patella, and ten others where the suppuration extended around the knee-joint or its ligament. In one and all a perfect recovery ensued by opening the abscess; in some, nature had performed the operation for the surgeon, and in these cases a small opening generally exists; it then expedites recovery to increase its size, as a fistula may remain and retard the cure.

A similar class of cases is seen attacking the elbow. A natural bursa is known to exist over the olecranon process, and any blow or injury may excite in it acute inflammation and suppuration; the disease may, and frequently does extend, to the cellular tissue around the joint, and produce an extensive abscess. The diagnosis is not difficult in such cases if the same rules are adhered to as are applicable in the cases previously described, and similar treatment is also as success-

ful as it is in cases of acute suppuration over the knee-joint.

It is quite unnecessary to quote cases to illustrate this branch of the subject; they are very common, and cannot well be misunderstood. Amongst the patients admitted into this hospital during the last five years I have but ten examples, but they are not cases which are frequently admitted, as they are treated as successfully amongst the out-patients.

Section II.

Chronic Inflammation of the Bursa.

Having dwelt thus briefly upon the subject of acute inflammation and suppuration of the cellular tissue about joints and of the superficial bursæ, we are led to the consideration of chronic and subacute inflammation of the same bursal structures.

In practice these cases are very common, the bursæ developed above and below the knee being very frequently the seat of chronic or subacute inflammation, and I have before me notes of eighty such cases. When taking place in women they are commonly denominated the housemaid's knee, as they are frequently produced by excess of kneeling. They come before our notice in all stages and conditions, and as it is only in the very earliest stage that any difficulty is

experienced in forming an opinion, I will relate a case as an example.

Case 32.—A woman æt. 26, after her usual daily work felt some pain in the right knee; the pain was situated over the knee-cap, and radiated over the joint. She went to a surgeon, who could not detect any mischief in the part, and the following day she came to the hospital. When seen, the joint appeared quite natural, and upon comparing it with its fellow no difference in size was visible. The pain still was present, and any pressure over the joint gave pain. Upon placing the fingers gently over the patella, and making moderate pressure, a peculiar crepitation was detected, which was not observed if the examination was more roughly made. It was evident that the disease was in this case situated in the superficial bursa over the knee-cap, and this peculiar crepitation was produced by the early inflammatory product poured out within its structure.

This is about the earliest condition of bursitis, and such cases are not uncommon, but I have known them mistaken or overlooked. Rest and the application of a blister over the part is generally quite sufficient to produce a cure.

From this, the earliest stage of bursitis, to other cases where, by continued and frequent attacks of inflammation, the bursa has consolidated and formed an almost solid fibrous tumour, there are many grada-

tions. The bursa may be soft and fluctuating, or firm and fibrous; it may be of a small size, or it may enlarge to a great extent. The largest I have ever seen extended from one and a half inch above the patella downwards to the tuberosity of the tibia; it was in a girl æt. 17, and of one year's growth; it was excised by Mr. Birkett, and found to contain rice-like seeds, both loose and adherent to its walls, formed from its fibrinous contents.

These cases are seen in men as well as in women, whenever the exciting cause, such as a blow or kneeling, may be applied.

Treatment.—They are easily amenable to treatment, the application of a blister, repeated perhaps once or twice, being generally sufficient to produce absorption of the effused fluid. In old and chronic cases, where the walls of the cysts are very thick, blisters are not so valuable, and in some cases they are perfectly useless.

Case 33. — In a woman, æt. 20, who had an enlarged bursa over both knees, and on which blistering had been tried and failed, the cysts were tapped and injected with iodine, one was injected twice, and the second required the application of a blister before recovery could be pronounced complete.

In some cases the passage of a seton through the bursa will induce sufficient inflammatory ac-

tion to neutralize the disposition of the bursa to pour out fluid, and thus induce a cure. By some surgeons the tapping of the cyst and application of firm pressure by pads and strapping is much employed. In all, absolute rest of the joint is necessary, which may be maintained by a posterior splint. When the tumour has become so hard and fibrous as to appear as a solid growth, no external application is of value, excision being the only remedy, and I have eight examples where this operation was performed; in all with a good result. There is no danger to be feared, beyond that which may attend or follow any operation; and the joint should be kept at rest by a posterior splint. The incision which appears to be the best is the one which will allow the line of cicatrix to be situated out of the median line, and thus remove it from any chance of injury when convalescence is established. I have seen it employed in one case with decided benefit; it was suggested and performed by Mr. Callaway upon a man æt. 36, who had an indurated cyst over the right patella, of seven years' growth. The incision was made upon the outer side of the tumour, and semicircular, with the convexity outwards; and when the wound had healed, the cicatrix was situated upon the outer margin of the patella, and thus out of all harm's way from kneeling.

The contents of these bursæ vary considerably; in the majority of cases they contain serum, in others

the material is more fibrinous, and this may exist as fibrous bands, forming a retieulated structurc, or as regular layers, and thus by repetition going on to form an almost solid tumour; I say almost, as I am not aware of any instanee where a perfect tumour was formed, all the cxamples whieh I have seen containing a eavity, although perhaps a small one, in the eentre of the growth; in some eases the fibrin takes a diffcrent form, and shows itself either as melon-seed or riee shaped bodies, whieh may be free or pedunculated. In one speeimen, removed from a man aged 35, the bursa containcd dark blood of the colour and consistenee of eoffee grounds, and, as Dr. Wilks has added in the Catalogue of the Guy's Museum, it might therefore have been ealled a hæmatoeele.

Case 35.—A somewhat analogous case oeeurred in the practiee of Mr. Cock. A woman, aged 40, having fallen upon her knec two days before her admission into thc hospital, was seized with all the symptoms of aeute bursitis; the pain, swelling, and inflammation were severe, and as it had a tendeney to spread laterally, a frce opening was made into thc eyst, when several large elots of blood eseaped; the eyst was well seen at the time, and there was no doubt that thc effused blood had been poured out from the cyst-walls. A perfeet reeovery ensued.

CHAPTER XII.

HYSTERICAL AFFECTION OF THE JOINTS.

It can be no subject of surprise to any practitioner who has seen or learnt much about that protean malady hysteria, that the joints should at times be its seat; and that symptoms should be manifested which have been, and may be, mistaken for disease of the articulation.

Since Sir B. Brodie, in his admirable monograph upon the Joints, pointed out so clearly this class of cases, all surgeons have become well aware of their nature; and the error of treating a mere functional disease for a serious local one is not now often made. There is difficulty at times in forming an opinion, but, as a rule, the diagnosis is not obscure.

The symptoms which the patient complains of are generally more severe than the examination of the joint would appear to warrant. The pain is stated to be of a very severe character, and the idea of manipulation of the part excites symptoms of apprehension. The muscles of the joint are frequently quite rigid, and attempts to move the articulation are attended with expressions of pain.

If, however, the part is carefully examined, there will, perhaps, to the eye, appear no reasons for the severity of these symptoms; there may certainly be a slight œdema of the part, over the seat of pain, but no redness. The temperature will not be increased, but, on the contrary, may be diminished. If the attention of the patient is taken away from the part, pressure will be easily tolerated, and no expressions of pain will be excited by firm manipulation. The joint may then be moved without indicating mischief within it. When difficulty is experienced in the diagnosis, if chloroform should be administered to induce insensibility of the patient, upon examining the joint, no one symptom of disease will be detected, and free mobility and signs of a healthy joint will clearly prove the character of the malady.

As a means of diagnosis, the inhalation of chloroform in such cases is of great value, as it renders the opinion of the surgeon positive, when probabilities previously alone existed.

This disease may be met with in males as well as females, although, of course, it is more frequent in the latter; it is seen generally in the young, and in those who are of an excitable and what is called nervous disposition. The functions of the body will generally be found out of order, and the catamenia the subject of some irregularity.

If the disease is situated in the hip-joint, the pain will be complained of about the part, and not, as is

usual in genuine hip-disease cases, in the knee. In other joints the pain, if closely observed, will shift its locality; at times appearing in one spot, and at others in another.

The indications for treatment are tolerably clear. As the disease is in the mind of the patient, or in the functions of the nervous system, let all measures be adopted to withdraw the attention of the patient from the supposed diseased part; let the secretive functions be corrected by appropriate remedies, and nervine tonics administered—the fœtid gums are perhaps the most efficacious, and the mineral tonics; if anæmia should be present give iron, and such other remedies as the general condition of the patient may demand. Induce the patient to use the limb, and to mix in the society of her kin; let the mind be occupied or drawn into some healthy channel, and thus taken away from the consideration of her malady. Good air and out-door exercise is a valuable adjunct; and, under such treatment, a recovery will generally take place. If the pain should be so severe as to prevent rest or to excite the irritability of the patient, sedatives should be employed, as opium, hyoscyamus, and camphor; and the local application of poppy fomentations, opium liniments, or chloroform, is often beneficial.

Remember that all pain is either central or peripheral: if central, as is the case in the disease under consideration, our real treatment must be directed to the seat of the disorder; if peripheral, that is, if

it is produced by some irritation of the nerve in its course or at its termination, our attention must be directed there. Let us not forget that these nervous pains are produced by tumours, aneurisms, and other causes, which press upon or involve the nerve; and such cases may simulate hysterical disease, and be mistaken as a consequence.

Table A.

Including the examples of diseased joints admitted into Guy's Hospital during the five years from Christmas 1853 *to* 1858.

	Total.	Cured.	Relieved.	Died.
Synovitis—				
Acute	25	14	—	11
Subacute	100	65	35	—
Chronic	29	12	17	—
Rheumatic	40	19	21	—
Diseased Joints—				
Hip	160	44	109	7
Knee	180	—	178	2
Thigh amputations (two after excision)	39	34	—	5
Ankle—and Tarsus	48	—	44	4
Leg amputations	10	9	—	1
Foot amputations	4	4	—	—
Shoulder	5	—	5	—
excised	1	1	—	—
Elbow	48	—	45	3
excised	8	7	—	1
Wrist	14	—	14	—
amputations	5	5	—	—
Tumours of artic. extrem. of bones	11	8	—	3
Anchylosis—Hip	7	—	7	—
Knee	52	—	52	—
Elbow	1	—	1	—
Loose cartilages	13	3	10	—
Bursitis—Acute	80	80	—	—
Chronic	80	80	—	—
Hysterical Joints	14	14	—	—
	974	399	538	37

ANALYSIS OF TABLE OF DISEASED JOINTS.

Under the heading of Diseased Joints are 522 examples.

160	of these were of the	hip . . .	or 30· per cent.
219	„	knee . . .	or 41·9 „
62	„	ankle and foot,	or 11·9 „
6	„	shoulder . .	or 1·14 „
56	„	elbow . .	or 10·7 „
19	„	wrist . .	or 3·55 „

Out of the 160 examples of *hip-disease,* 44 left cured; 109 were relieved, leaving the hospital with the disease in a torpid condition, or with the joint anchylosed; and 7 died: but of the 219 cases of disease of the *knee-joint,* 39, or 17·7 per cent., were amputated (two after excision), and of these 5 died; of the remaining 180, 2 died; the others leaving the hospital relieved to various degrees, with the disease in a torpid if not arrested condition.

Amongst the 62 instances of disease of the *tarsal* or *ankle-joints,* 10, or 16·1 per cent., were amputated, and 1 of these died. In 3 Chopart's operation and in 1 Syme's, was successfully performed; 44 were relieved by treatment, and 4 died.

Reviewing the cases of disease of the joints in *the upper extremity,* 6 only were of the *shoulder-joint;* 1 of these was excised with success, the remaining 5 leaving with anchylosed joints: 56 were of the *elbow-joint;* 8 cases, or 14·3 per cent., were excised; 1 of these subsequently died, and in 1 amputation

was performed; in the remaining 48 cases, 3 died; and the others left relieved to various degrees.

Amongst the 19 cases of disease of the *wrist-joint*, 5, or 26·3 per cent., were amputated with success; the remainder were relieved by treatment.

Table I.

Showing the ages at which disease commenced in the various joints.

Years.	Hip.	Knee.	Ankle.	Shoulder.	Elbow.	Wrist.	Total relieved.	Died.	Per cent. of deaths.
Under 5 . .	35	28	7	—	5	—	74	1	1·3
From 6 to 10	40	50	11	—	12	—	110	3	2·7
„ 11 to 20	48	61	13	—	16	3	137	4	2·9
„ 21 to 30	15	35	11	1	11	8	75	6	8·
„ 31 to 40	10	21	11	—	5	3	49	1	2·
„ 41 to 50	4	17	5	1	4	3	33	1	3·
„ 51 to 60	2	5	2	2	1	1	12	1	8 3
„ 61 to 70	—	1	2	1	2	1	6	1	16·6
	154	218	62	5	56	19	496	18	3·5

PART II.

THE INJURIES OF JOINTS.

CHAPTER I.

SPRAINS AND RUPTURE OF LIGAMENTS.

Ligaments, like other soft structures, are liable to sprains, laceration, or rupture.

A sprain of a joint is a very frequent accident, attended with more or less stretching or laceration of the ligaments; but the distinct rupture of a ligament is comparatively a rare accident. All joints are liable to sprains, but the ankle is by far the most frequent seat. The accident is generally attended with severe pain of a sickening character, and not unfrequently fainting is a consequence; extravasation of blood to an extent varying with the amount of injury will accompany the accident; and the effusion of inflammatory serum both within and external to the joint will generally ensue, also in proportion to the extent of the local mischief, and the disposition of the patient to inflammatory action.

When much laceration or rupture of the ligaments take place, dislocation is generally an accompaniment. When the injury is a severe one, the repair of the part is a slow process, and the patient as a rule experiences pain upon free movement for

many months; for ligaments appear to possess but small powers of reparation, and, as a consequence, any severe injury to them becomes of importance.

Treatment.—When a sprain has taken place, it is hardly necessary to dwell upon the necessity of giving absolute rest to the joint. Motion excites pain, and, consequently, the patient is generally disposed to avoid it; but this repose must be maintained for some time; for chronic disease of a joint is very frequently excited by such an injury as a sprain, and rest is an important means of preventing such an occurrence. The joint should be raised upon a pillow, and hot or cold applications employed, according to the relief which they respectively afford to the patient. If cold lotions subdue pain, let them be ordered; if warm fomentations, let them be applied. Any cold spirit lotion will answer the purpose; the object being to subdue the inflammatory action which is sure to follow upon such an injury. The best warm application is a thick flannel wrung out of hot water or poppy fomentation surrounding the part, and another dry one over it.

If the œdema and other symptoms of inflammation are very great, the free application of leeches should not be forgotten; and if the extravasation of blood after the accident is severe, apply ice. Under these means the immediate symptoms are generally subdued; time must then be given to allow the injured parts to regain their strength and to undergo repair.

Stimulating liniments and moderate frictions of the part expedite the cure, and also give great comfort to the patient. A local warm bath at intervals relieves the stiffness of the parts, but the use of the joint must be very limited for many weeks if the sprain has been severe. Whenever movement excites pain, rest should be observed; when stiffness alone is present, friction and stimulating applications will lessen it; but pain demands rest. If it continues, an occasional blister over the part, or perhaps leeches, according to its severity, will be of advantage; but any continuance of pain must lead the surgeon to fear that some chronic diseased action is going on in the joint, and it should be treated accordingly. When all symptoms have passed away, and weakness only is left, a good bandage or strapping will give support. In some cases a starch bandage is of benefit, but the simpler means are generally sufficient.

When a ligament is completely ruptured, the joint will always be much weaker than its fellow, and some extra mobility will be allowed. The parts should be preserved in absolute rest for many weeks, to give full time for nature to repair the mischief: indeed, such an injury is far worse than a fracture; for a fractured bone, when it has thoroughly united, does not yield; but a ligament has always that tendency, and by too early use of the limb elongation is produced, and with it weakness of the joint.

CHAPTER II.

WOUNDS OF JOINTS.

The experience and knowledge of wounds of joints which the civil surgeon acquires must necessarily be somewhat limited, and it is to his military brethren that he generally turns for the information he may desire, as to the symptoms, results, and treatment of such injuries. My notes of cases admitted into Guy's Hospital, however, afford instances of all the different wounds to which joints are exposed, and include the incised, lacerated, and punctured, together with examples of compound dislocation, compound fracture with laceration into the joints, and gunshot wounds.

The symptoms which generally follow a wounded joint are very variable, and are by no means in their severity proportionate to the extent of injury: a wound may in one subject be followed by but slight inflammatory symptoms, and in others acute suppuration of the joints with its attendant dangers may be the sequence. In one case, even of severity, the joint may perfectly recover, in another its loss by disorganization or by anchylosis may be the end;

the constitution and habits of the patient, in these cases as in others, having a marked influenee in their result, independent of any treatment, however skilful.

Case 36.—The first case I shall relate is one of a severe character as regards the wound, but of simplicity with respect to symptoms: the joint opened was the knee, but its result was all that could be wished. A healthy, but strumous-looking girl, æt. 9 years, when running fell upon an oyster-shell, which produced a wound one and a half ineh long, above and to the side of the patella, exposing the joint, as indicated by the flow of its synovia. The knee was kept at rest, and fixed by sandbags at an obtuse angle, the edges of the wound were adapted by sutures, and a piece of wet lint applied. All went on well, with but slight effusion into the joint. Upon the fourth day a straight splint was applied, and upon the twelfth some extra synovial inflammation took place. Antimonials and salines were given with benefit, and in four weeks all inflammatory symptoms disappeared. Tonics were subsequently administered, and in four months from her admission she left with a good, but slightly stiff joint.

Case 37.—The second case is one of a laeerated wound into the knee-joint, and well illustrates the valuc of the application of eold in subduing inflammatory action.

A man, æt. 27, in a quarrel with his wife, reeeived

a blow upon his left knee from a china basin, which she threw at him. An obliquc lacerated wound was the rcsult, extending across the joint from above downwards and inwards, laying it completely open.

Sutures and strapping were applied, but only sufficient to keep the parts in apposition, and the joint kept cool by a process of irrigation, or the constant trickling of cold water over the part covered with a layer of lint. A mercurial in the form of the Hyd. c. Cret., gr. ij, Pulv. Doveri, gr. v, was given twice a day, and perfect rest enforced. For three days all inflammatory action was checked, and the wound healed; but by accident the application of the cold was omitted for one night, and severe inflammation followed; this, however, was speedily subdued by the re-application of the remedy; and in one month the man left the hospital with a sound joint.

Case 38.—The third case is one of injury to the elbow, equally fortunate in its termination with the preceding, and affords a good example of the power of nature to effect a cure, assisted but slightly by art, rest being the chief element of treatment.

A man, æt. 17, fell down a cellar upon some empty bottles; a portion of the glass perforated the left elbow beneath the external condyle, producing a wound an inch long. Some slight hæmorrhage followed, accompanied with great faintness. The wound was brought together by sutures, and water dressing applied, and the arm placed in a semiflexed position.

But slight constitutional disturbance followed, and the wound healed rapidly, the joint for the first four days being slightly swollen. After two weeks some slight movement of the joint was permitted, all symptoms of injury having subsided, and after one month's rest in the hospital he left with the joint as sound as its fellow.

The four next cases are punctured wounds, and, as might be expected, are of a more severe character. The accident in three was followed by acute inflammation of the joints, and in one by inflammation of a less severe character. In one of the former, amputation was resorted to with immediate success, although the patient died of some secondary disease a year afterwards. In the second, a good recovery was made; and in the last, death rapidly ensued.

Case 39.—A boy, æt. 10 years, fell out of a window upon a brass spike, the point perforating the joint close to the patella. Some oily fluid made its escape after the accident. The child was kept perfectly quiet; the joint rapidly enlarged, and some fever was present, but no medical advice sought for two weeks, when he was brought to the hospital as he made no progress. The joint was then painful and swollen from effusion. The point of perforation was distinct, but nearly closed, and the constitutional disturbance was very slight. Ice was applied in a bladder, and rest enforced. In three days all swell-

ing had subsided, and in two weeks he left with a healthy joint.

Case 40.—A man, æt. 26, during a fight was stabbed in the right knee with a fork; the prongs entered quite two inches upon the inner side; no bleeding followed, but the joint became rapidly painful and enlarged. For three days he rested at home, and then sought advice. When admitted the joint was enormously swollen, and exquisitely painful; the skin was hot, and pulse full. Thirty leeches were applied, and purgatives, with antimonials and colchicum given. After three days the symptoms abated, although the pain was still intense, but relieved by opium. The swelling gradually disappeared, and on the fourteenth day a blister was applied with decided benefit, for upon the sixteenth the joint had nearly regained its natural size. Upon the twenty-sixth the joint was strapped up; and in six weeks from his admission he left with a sound joint.

Case 41.—A man, æt. 65, of a bad habit, when at work, making chairs, punctured his right knee with an adze; acute inflammation and suppuration followed, uninfluenced by the treatment adopted, viz., the application of leeches, with the exhibition of antimonials and mercury, and subsequently tonics and support. The powers rapidly gave way, not allowing any operative interference; and after five weeks he died.

Case 42.—A man, æt. 27, of a strumous aspect, punctured the inner side of his knee with an adze; enlargement of the joint rapidly followed, unattended, however, with very severe pain. Several weeks after the accident he applied to Guy's, with the joint enlarged and evidently suppurating. The joint was opened freely, as the pus was burrowing upwards and downwards; erysipelas unfortunately made its appearance, preventing amputation. After a severe struggle he rallied, and in about eight months amputation was performed; from this he rapidly convalesced; about six months after an abscess appeared in the opposite hip, which burst, and from this he gradually sank.

From the cases just quoted we may gather a very fair idea of what we may expect after wounds of joints, and form a just one of the principles which should guide us in their treatment.

In healthy and young subjects, as the first five cases illustrate, the inflammation that follows such an injury will vary in its intensity; but will generally, by early and proper treatment, be kept within a dangerous limit.

In the first four cases the inflammation was never of a very acute character, although in Case 37 the omission of the application of cold indicated what it would be if left untreated.

In Case 40, also, the symptoms set in with marked severity, and were subdued only by a prompt and energetic treatment.

Case 41 shows the result of such an accident in an old and cachectic man; the joint proved unable to resist the inflammatory action which the injury is prone to induce, and the powers of life to withstand the drain upon its strength.

Treatment in such cases seems of little service, the rapidity of the diseases preventing its taking effect. In Case 42 we have a subject as unfavorable for such an injury as could be imagined; the inflammatory action induced by the puncture was sufficient to set at work the latent disposition to strumous disease to which he seemed naturally liable. Rapid disorganization of the joint was the result; and although the extra drain upon an exhausted system, as caused by erysipelas, proved a temporary impediment to any operation, still he rallied after the removal of the limb, and recovery might have been expected if the tendency to strumous disease had not manifested itself in other parts. In such a subject any injury would have been sufficient to make manifest his general tendency to disease, and a wounded joint was too serious for his weak powers to overcome.

Treatment.—The treatment that should be adopted in these cases is not complicated. Absolute rest is indispensable, and without it all other treatment is of no value. In simple cases where signs of inflammatory action are very slight, as in Case 38, but little else is requisite, a cold lotion or wet rag only being

necessary. The joint should be placed in the position which is most comfortable, a slightly flexed one being, as a rule, to be preferred, and kept there by means of sand-bags or splints. The wound in all cases should be speedily closed, and its edges adapted, if necessary, by sutures. All probing the wound, bandaging and strapping the joint, should be avoided, as being not only unnecessary, but absolutely injurious. The local treatment to be preferred in most cases is cold, not generally in a dry form as ice in a bag, although this is sometimes of value (*vide* Case 39); but applied, as in Case 37, by allowing a gentle and constant trickling of water over the part, covered with a layer of linen.

The comfort of this application is only equalled by its value, and Case 37 well illustrates its beneficial influence. Pain ceases, or is considerably diminished, immediately after its full action has been experienced, and the delight that I have felt at its success is surpassed only by the expressions of the patients.

In some cases, when not seen at an early period, leeching must be freely employed, followed by some warm application, such as a poultice, or, which is better, a hot wet flannel.

The constitutional treatment in some cases must be most energetic. In acute cases, opium, antimonials, and colchicum are of great value, mercury having no time for action. In the more chronic form, some mercurial, such as Hyd. c. Cret., in three or four grain doses for an adult, with an equal quantity of Dover's

powder, every four hours, may be required. This with purgatives and low diet is all that is neecssary.

When the aeutc symptoms have subsided, a blister will oecasionally hastcn thc absorption of thc effused fluid, and the applieation of pressure by strapping will gencrally effect a curc. In weak subjects, tonics will be called for, and small doses of thc iodide of potassium with the syrup of the iodide of iron, in some bitter infusion, is decidcdly the best. When suppuration ensues, other treatment must be adopted, thc pus should bc speedily evacuated, and the question of some other operative interferenee must soon oeeur; but the discussion of that question is not now my objeet. Support and tonies must thcn be frecly givcn, and the ease assumes a different aspeet, and must be elasscd amongst those of disorganized joints.

CHAPTER III.

COMPOUND DISLOCATION OF JOINTS.

The subject of compound dislocation of the joints is one of deep interest, and demands from the surgeon an amount of attention, commensurate only with the importance of the part which is the subject of the injury; the local and constitutional effects of such an accident are also so various, and their treatment involves so many serious surgical questions, that the surgeon cannot dwell too much upon the subject to enable him to cope with all the emergencies which such a case may bring before his notice.

The constitutional and local effects of an acute synovitis, the result of a wound, have been already given in a former chapter, together with the treatment best calculated to restrain its violence; and if a restoration to a normal condition of the joint can rarely be expected in simple wounds, even by a careful and energetic treatment, how much smaller must be the chance of such a result, when there is in addition to the exposed cavity, a separation of the bones, with the attendant laceration of the liga-

ments and parts around? And if in the former cases severe constitutional symptoms should be experienced, surely in these latter an equal intensity may be expected, and with it a corresponding difficulty of treatment.

Practically, such difficulties are too frequently experienced; and with the hope that some benefit will accrue from their careful consideration, I shall now proceed with the subject, illustrating it by the short notes of such cases as the experience at Guy's Hospital has yielded to me.

Compound dislocation of the hip and knee-joints are fortunately of rare occurrence, and must in their local and general effects produce symptoms which jeopardise the life of the patient. The same injury to the shoulder is also exceptional, compared with the frequency of its simple dislocation. But the joints which are most frequently the subjects of compound dislocation are the ankle and elbow, and from my note-book I can extract the following cases.

Case 43.—A boy, æt. 8, when riding in a cart, with his legs hanging over the side, managed to get his right foot entangled in the spokes of the revolving wheel; the foot became jammed against the side of the cart, and was consequently dislocated outwards; the ankle-joint was exposed by an extensive lacerated wound, extending across its anterior aspect, laying bare the articulating surface of the astragalus: the

integument of the sole of the foot was also lacerated, but the tendons and vessels were not apparently much injured.

The dislocation was reduced, and the foot kept cold by a spirit lotion; severe pain and some constitutional disturbance followed the accident, and upon the fourth day free suppuration; upon the sixth an outer splint was applied; superficial gangrene of the integuments followed, exposing the tendons and the ends of the bones by the tenth day. Tonics and support were freely given, and upon the fourteenth day a more healthy action appeared; the parts from this time rapidly improved, cicatrization went on gradually, and the wound contracted favorably; after two months a small piece of bone exfoliated from the inner side of the joint, which gradually anchylosed; and after eight months' residence in the hospital, the patient left with a stiff and fairly anchylosed joint, but with some sinuses communicating with necrosed bone.

Case 44.—The second case was one of dislocation of the elbow, and occurred in the person of a healthy carman, æt. 49. The injury was caused by the passage of a cart-wheel over the joint, producing a dislocation of the radius and ulna backwards, with a wound over the inner condyle of the humerus, exposing the joint; a piece of the external condyle of the humerus was also fractured. The dislocation was easily reduced, an angular splint was applied,

and cold applications. All things went on well till the sixth day, when erysipelas unfortunately appeared; free suppuration of the whole forearm and joint followed, and was treated by free incisions into the part, and stimulants; after a severe struggle, the patient rallied, and in a month began to improve, the wounds healing very kindly. A bronchitic attack again kept him back; but after three months, he left the hospital with a joint firmly anchylosed at a right angle.

Case 45.—The third case was one of dislocation backwards of the ulna, in a woman, æt. 47, who fell down stairs upon her hand; the olecranon process projected externally through a wound, which completely exposed the joint. The dislocation was reduced, and the arm kept at rest. Cold applications were employed, and Dover's powder given to procure sleep; severe suppuration of the joint and forearm followed, treated by free incisions; tonics were given, and the arm kept at a right angle by means of splints; and after ten weeks' residence in the hospital, the woman left with an anchylosed, but otherwise sound limb.

Remarks.—The three cases just cited are very good examples of compound dislocation of the ankle and elbow-joints; the symptoms which followed the injury were in all somewhat similar, and were in all followed by a favorable result. Acute suppuration

of the joints was the chief symptom, attended at first by some constitutional excitement, and subsequently by a corresponding depression; the profuse suppuration acting as a powerful drain upon the system.

The treatment in all was simple, and in principle alike; perfect rest was preserved, with the joints at an angle which may be called the most useful, either by means of sand-bags or splints; inflammation was modified by cold applications; and constitutional irritability and pain allayed by mild opiates, such as Dover's powder. Support was given; at first with caution, and enough only to keep up the powers of the patient, but when suppuration was fully established, with no unsparing hand, stimulants, such as wine and porter, being freely administered.

When suppuration ceases in these cases, time is the chief agent of success. The joint must still be kept at rest, by splints or other means, at the angle which is most to be desired; support and tonics are to be given, in proportions sufficient to preserve the powers, and alteratives occasionally to keep the secretions in good order, but time must complete the cure. The new product that is poured out between the articular extremities of the bones, which by the inflammation following the injury have been stripped of their covering of cartilage, must gradually become firmer, frequently passing through the fibrous to the bony union.

The hope of regaining movement in a joint in

which acute inflammation has followed upon such an injury as compound dislocation, must be regarded as very slight; but that hope should always be before the mind of the surgeon, so as to enable him to modify his subsequent treatment by employing gradual, and perhaps forcible movements, when the acute symptoms have subsided. Still such a result is very rare, and must not be expected.

In the three cases given as examples, anchylosis had become established, and in one only (Case 43) had necrosis of the bones followed the injury; the inflammation and sloughing which followed the dislocation having extended to some portion of the bone, and destroyed its life.

Case 46.—A fourth case remains to be related of dislocation of the tarsal bones: it occurred in a girl only one year and a half old, and was produced by a horse treading upon the foot; the fore part was completely crushed, and separated at the calcis and scaphoid bones; the pendulous portion was removed, a flap having been made from its lower portion: the stump, however, sloughed, and the child never thoroughly recovered from its collapsed condition; upon the fifth day convulsions appeared, and upon the eighth the child died exhausted.

Comments upon this case are unnecessary—the extent of injury warranted no other treatment than that adopted—and no powers which the surgeon

possesses could have given the child strength to battle through such an injury.

In cases of compound dislocation, as in others of compound fracture, the extent of injury to the soft parts must form the principal point to guide us in operative interference: when the larger vessels and nerves are injured, or the soft parts so pulped as to offer no chance for their recovery, amputation must be resorted to.

In former times the propriety of amputation in compound dislocation would not have been doubted, and the limb would, as a rule, have been removed at once; in these days of conservative surgery, the rule may be reversed, and it may be undoubtedly given as a fact, that few cases demand such treatment.

In exceptional cases only of compound dislocation of the shoulder, elbow, wrist, or ankle-joints, should amputation be thought of as a primary operation; as a secondary one it may occasionally be demanded, although, perhaps, in many cases, excision may offer the best alternative.

In compound dislocation of the knee-joint, the question of amputation may perhaps be seriously contemplated, although, fortunately, the accident is a rare one. In such an injury to the hip-joint, but little treatment can be of service, as death must, indeed, be regarded as tolerably certain, for it is hardly to be imagined that such an injury could be produced without extensive and irreparable laceration of the soft parts around.

In some instances of compound dislocation, particularly of the larger joints, the question of exeision may occur to the surgeon's mind, and should be carefully considered; and in severe eases of compound dislocation of joints, when anehylosis may be considered as being very detrimental, as in the shoulder and elbow, and in which, after suppurative inflammation, the ehanees of mobility may be considered as *nil*, it would appear that excision may be of value, not only by destroying the joint and preventing the severe disturbanee which its aeute suppuration is sure to induee, but also offering a ehanee of gaining a moveable joint where previously no hope, or very little, could be entertained.

CHAPTER IV.

COMPOUND FRACTURE INTO JOINTS.

The next class of cases which claim our attention are compound fractures into joints; and if the cases previously given are of a serious character, how much more so are those which are classed under the above head? For, added to the danger which necessarily follows upon an exposed joint, we have the dangers of a compound fracture, and all the constitutional and local disturbance which must ensue after such an injury. The cases which my notes yield afford examples of compound fracture of the shoulder, elbow, knee, and ankle-joints; those of the hip fortunately being very rare.

Case 47.—The case of compound fracture of the shoulder-joint occurred in a boy, æt. 13, who was admitted with complete evulsion of the arm below the head of the humerus, the joint being exposed, and all the soft parts lacerated, from the effects of machinery. The head of the scapula, with the acromion and coracoid processes, were sawn off by Mr. Poland, to allow of adaptation of the injured integu-

ments, and everything went on afterwards with slow but satisfactory progress, and he left after seven months' residence with the wound nearly healed.

In a case such as the above, an alternative was hardly offered to the surgeon; amputation had been really performed by the accident, and it was left only to the operator to make as good a stump as possible. In other cases of less severity, where the larger vessels and nerves are injured, amputation must occasionally be resorted to; but if these are whole, and the fracture into the joint is not of a very comminuted character, an attempt should be made to save the limb. When the bone is much injured, as in gunshot wounds, the excision of the head of the bones appears to offer the greatest advantages.

The three next cases are of compound fracture of the elbow-joint.

Case 48.—The first was in a healthy boy, æt. 16, who was run over by a horse and cart, the wheel passing over his left elbow-joint, the right humerus was also fractured. The condyles of the left humerus were fractured into the joint, but not much displaced, and a V-shaped wound communicated with its cavity. The arm was placed upon a pillow, at a right angle, the soft parts adapted by strapping, and warm-water dressing applied; in three weeks the wound had healed, and in six the boy left with good movement in the joint.

Case 49.—The second occurred in a man æt. 45, and was produced by a fall off a cart. The condyles of the humerus were fractured into the joint, which was opened by a moderate-sized wound. Fracture of the thigh was associated with the above injury. The arm was kept at rest upon a pillow and fixed by sand-bags, and the wound brought together by strapping, and warm-water dressing was applied. Everything progressed favorably, and in two months the man left with an anchylosed joint and good limb.

Case 50.—The third case was in a man, æt. 55, who, in a fall, fractured his olecranon process, and freely opened the joint. Severe suppurative inflammation followed, associated with great constitutional disturbance. In two months the limb was amputated, and from this time he rapidly recovered.

These three cases are good illustrations of the effects of compound fracture into joints; in all, the same treatment was at first employed, but with very different results. In the young and healthy (Case 48) the accident (although complicated with other injuries) was followed by a success which can rarely be expected, viz., the integrity of the joint; in Case 49 the inflammation which followed the injury proved sufficient to destroy the joint, and anchylosis was the result. In most cases this is what we should expect, and indeed be grateful for, the chief point to remember in the treatment being the angle at which

the joint should be preserved, that of a right angle being the most useful.

In Case 50, which occurred in an older man, whose powers were not strong enough to resist such severe inflammatory action as must be anticipated after such an injury, acute suppuration followed, so intense as to warrant amputation of the limb to save the patient's life.

We will now proceed to relate a case of great rarity and interest.

Compound fracture of the patella into the knee-joint.

Case 51.—A man, æt. 40, was admitted on May 11th, 1841, under the care of the late Mr. Aston Key. He was a healthy, temperate labouring man, who, on the morning of his admission into Guy's Hospital, fell off a wharf upon some pig iron with his leg bent under him.

He was admitted with a severe laceration over the knee, with the patella starred and comminuted, and with synovial fluid freely escaping.

The leg was fixed at once upon a posterior splint, and thirty leeches applied, and two hours after these were repeated, and three grains of gray powder and three of Dover's powder were given every four hours. A pad of lint was applied to the wound and fixed by a bandage.

The inflammation which followed was severe, causing intense pain, but daily leeching for a week

perfeetly subdued it, and from that time the man rapidly reeovered; leaving the hospital June 27th with a good leg and joint quite moveable.

This case is an extraordinary example of perfect recovery from a severe aeeident. The treatment adopted was energetie, and the sueeess which attended it is its strongest reeommendation.

The patient had been a healthy and temperate man, or else a very different result would probably have ensued. Sueh sueeess is unfortunately very rare, and it is only in like subjeets that it may ever be anticipated.

We now pass on to compound fraeture of the ankle-joint, and have two cases to illustrate this form of injury.

Case 52.—One, a boy, æt. 14, who was admitted with his foot almost separated and completely erushed from a blow with a thrashing maehine: amputation was at onee performed, and in one month he left well.

Case 53.—The seeond ease oecurred in the person of an intemperate eellarman, æt. 42, who having fallen into a diteh, dislocated his foot outwards and fraetured both of the malleoli. The joint was freely opened, by a wound three inehes long over its inner aspect; the soft parts were also much injured. Primary amputation was advised, but rejeeted; the

dislocation was therefore reduced after division of the tendo Achillis, the wound brought together by sutures a posterior splint applied to preserve perfect rest, and irrigation with cold water used: acute suppuration, however, ensued, extending up the leg and over the knee-joint; amputation was therefore performed above the knee upon the tenth day, and convalescence gradually followed, interrupted only by the removal of a piece of necrosed bone, and in ten weeks he left cured.

In the first case related (Case 52), the propriety of amputation could not be doubted, as the bones and soft parts were so crushed as to prevent all hope of reparation following. But in the second (Case 53) the question became one of greater difficulty, and it is in such instances that the surgeon requires to bring forward the highest faculties of his mind, and to weigh with most accurate discrimination the chances of his success. In the Case 53 the injury to the joint would not have been irreparable in a subject whose habits of life were steady and powers good; but, in a man whose habits were intemperate, and whose occupation was anything but healthy, the chances of success by delay were indeed poor; the sequel of the case proved the correctness of this opinion, for acute suppuration followed, which extended even above the knee, and demanded amputation of the thigh to prevent a speedy and certain death.

Gunshot wounds of joints.

Gunshot wounds of joints form a variety of compound fractures, which differs principally in the amount of comminution of the bones. In most cases the heads of the bones are splintered into pieces, and, as a consequence, the hope of preserving the joint may in general be regarded as very poor.

In civil practice these cases are not of frequent occurrence, and I can give but two examples, and both of these are of the ankle-joint.

Case 54.—The first was in a woman, æt. 48, who when standing four yards distant from a small signal pistol, loaded with oakum, received the charge in the outer malleolus of the left foot, splintering it into many pieces, and opening the joint; several small pieces of bone were removed with the oakum charge. A posterior splint and foot-piece was applied, and constant irrigation of cold water ordered. This subdued all inflammation and allayed pain, and everything progressed well: after seven weeks' stay in the hospital, for some family reason she returned home, convalescing, but not cured.

Case 55.—The second instance occurred in a man of intemperate habits, æt. 50, who, from the accidental discharge of a gun, loaded with slugs and shot,

close to the ankle, received a compound comminuted fracture of both malleoli. The charge passed completely through the joint; serious constitutional disturbance and severe bleeding followed the accident; the latter was arrested by pressure, but recurring upon the second day, he came to Guy's. When admitted, under the care of Mr. Hilton, the hæmorrhage had ceased, the joint was much inflamed, and bones considerably comminuted; the tibial vessels were found to be entire; the soft parts were much inflamed, and constitutional powers feeble and pulse irritable: amputation was advised, but rejected; splints were therefore applied, and cold-water dressing: at night delirium appeared, treated by opium, and the following day wine was given; the wound took on a sloughing action, and upon the seventh day after the accident amputation was permitted. Opium and stimulants were given with a careful liberality; but twenty-four hours after the operation, symptoms of tetanus made their appearance, which gradually increased, and in two days, or upon the tenth day after the accident, it proved fatal.

The treatment of these cases will be better discussed when we proceed to the consideration of the previous cases as a whole.

Prognosis.—The prognosis in the various injuries to joints which have just been described, should always be of a most guarded character; they are

undoubtedly some of the most serious cases which come under the observation of the surgeon, and should accordingly be viewed by him in a most serious aspect. As regards the preservation of the joint, but little hope can be entertained, although such instances of success may occur (Cases 48, 51). In the majority of cases, recovery of the patient with an anchylosed joint should fairly be regarded as success. In some instances a fatal termination must from the commencement be anticipated, and in others the patient's life will be saved only by amputation of the limb. Upon the whole, the surgeon should always explain the different chances to the patient's friends, and thus protect himself, and prepare others for a doubtful result.

Treatment.—Having now described the different injuries to joints, and given cases illustrating the forms which are most frequent in their occurrence, it may, perhaps, not be without benefit to consider the cases of compound dislocation, compound fracture, and gunshot wounds of joints, as a whole, and to attempt to bring out some general rules of treatment to be adopted in similar instances; and although there is no class of injuries in the treatment of which the surgeon must be more guided by the individual symptoms which each case presents, still some guides, I believe, may be given to aid him in forming an opinion.

In the hip- and knee-joints these injuries are for-

tunately rare; when they do occur the amount of damage to the soft parts, in the majority of instances, must render the case one of peculiar danger, and the saving of the life by the sacrifice of the limb may be considered fortunate. Still I can imagine instances, where the wound is small, and the powers of the patient good, where the soft parts are not much injured, or the bones comminuted, in which an attempt to save the limb should be made, and with good prospects of success (Case 51). The dislocation, if present, should be reduced; the bones, if broken, should be brought into as good a position as possible; the wound, if gaping, brought together by strapping; if small, treated by water dressing; irrigation with cold water should be employed, and perfect rest preserved by the application of splints.

If the heads of the bones are comminuted, particularly in gunshot wounds, or if, in dislocation, the heads of the bones fail to be returned into their normal position, excision, there is no doubt, offers the greatest advantages; and if there is a doubt about the propriety of this operation upon the larger joints, such as the hip and knee, in pathological conditions, I think there can be none in the cases under consideration; and although the cases should be well chosen, the operation of excision appears to offer the best chances of success.

When the shoulder, elbow, wrist, and ankle-joints are the seat of injury, it is only in exceptional cases, as in Cases 46, 47, 52, 55, that primary amputation

should be performed, that is, in cases where all hope of reparation may be considered futile. When the health and habits of the patient may be pronounced sound, and the soft parts (particularly with regard to vessels and nerves) are not irremediably destroyed, an attempt should certainly be made to spare the limb. (*Vide* Cases 43, 44, 45, 48, 49, and 54.) And if acute suppuration should ensue, and the powers of the patient appear to sink by the drain upon his system, secondary amputation may be resorted to with a more favorable prospect of success (Case 50).

In patients of bad and intemperate habits, where it is to be expected that a small injury will produce great constitutional disturbance, the severe trial which a compound dislocated or fractured joint is sure to prove, should be met by primary amputation (Case 53); although in other and more favorable subjects the injury would not demand such treatment.

The operation of excision of joints may, perhaps, here prove of some advantage, and there is no doubt that there are cases in which, by its performance, a limb may be saved. When the heads of bones are much comminuted, particularly in gunshot wounds, and the vessels and soft parts are not materially injured, I can believe this operation to be of great value; it should undoubtedly be preferred to amputation, such being only justifiable when all hope of reparation may be considered futile.

When an attempt to save the joint is to be made,

it is to be preserved at rest by splints and sandbags, in a position which will prove most useful to the patient; vessels should be tied; the wound cleansed, and its edges adapted, if required, by sutures; loose fragments of bone removed; and ice, spirit or water application, as by irrigation, constantly applied; the secretions are to be attended to, and powers kept up, in the early period by nutritious but unstimulating food, but when suppuration has commenced, by wine and other tonics. Constitutional remedies are of little use beyond the attention to the secretions and preservation of the strength; opiates, however, should not be neglected, to allay pain and constitutional irritation.

CHAPTER V.

COMPOUND DISLOCATION AND FRACTURE OF THE PHALANGEAL JOINTS.

I HAVE not included in the previous pages the subjects of compound dislocation and fracture of the phalangeal joints, as the position and value of the joints themselves render a distinct consideration of their treatment requisite; and the slight constitutional symptoms which such injuries induce, enables the surgeon to treat them with purely local considerations.

It is unnecessary at the present time to dwell upon the importance of the integrity of the hand as a whole, or to bring forward arguments to prove the necessity of saving as much as possible of the thumb and fingers. Still this rule has its limits, and although at all times and in all injuries, it is the duty of the surgeon to attempt to save a joint, it must not be forgotten that anchylosis of some of these joints may prove an impediment rather than an advantage to the free use of the hand. With the thumb, I believe, the above rule may be considered absolute, and an attempt should invariably

be made to save the joints, and as much as possible of the injured parts, leaving the bone to granulate being better than its removal; for the use which may be made of a thumb, either fixed by anchylosis of the joints or shortened by injury can only be appreciated by those who have been fortunate enough to witness such instances.

With the fingers, the rule will not hold so good; for although in the abstract it may be considered just, practically it will be found occasionally to fail, and the loss of a finger will be found to be of less inconvenience than a joint fixed by anchylosis.

A stiffened metacarpo-phalangeal joint must always be an impediment to a labouring man, although to a gentleman it may be of service to preserve the appearance of the part. A fixed first phalangeal joint will to some trades prove unprejudicial; to others it will be of great inconvenience. But an anchylosed joint between the extreme phalanges will seldom prove a serious impediment.

Upon the whole, the patient himself must be called into consultation with the surgeon, and the advantages and disadvantages which may accrue from such a result, must be weighed with care, and the treatment moulded accordingly; for it is too common to find in the London hospitals a patient applying for amputation of a finger which has been carefully preserved after injury, but, when cured, has been found an impediment to the free performance of his trade.

And although I should not wish to be considered an advocate for general amputation of fingers where anchylosis may be expected, nor an opponent to what is now called conservative surgery; but rather an advocate for such a practice, where a fair chance is offered for the preservation of the limb, and what is of more consequence, a fair chance of its subsequent usefulness; still, in the words of a clever writer, "By a limb saved, I do not mean one with the wounds healed, having, nevertheless, the extremity contracted, bent, motionless, or otherwise useless; cases which by a loose kind of phraseology are often termed 'limbs saved.' The object of saving a limb is that it may be useful. If this is not the result, the member, by hanging to the body of the patient, is lost in my estimation, as truly as if amputated; but with the additional circumstances of being converted into a source of misery to the sufferer, an impediment to the free motion of the rest of the body, and often a cause of irremediable ill health. Such cases I hold to be among the worst specimens of bad and injudicious surgery." To the surgery of the fingers, those observations apply as forcibly as to the surgery of other parts; and although it may be gratifying to a surgeon to save a limb, still subsequent utility is the only sound test of the value of the practice; and in our anxiety to achieve such a triumph, we must guard ourselves against falling into such errors as the passage just quoted so well enumerates.

The frequency of the dislocation of the bones of the thumb is not so great as to afford a large selection of good cases, and from my notes of cases of compound dislocation I can bring one in which the thumb of a boy, æt. 13 (Case 56), was completely blown off at its carpal joint by the explosion of gunpowder. The parts were left to granulate, and water dressing employed; and although some secondary hæmorrhage followed, a steady convalescence ensued.

Case 57.—In an instance of simple dislocation of the first phalanx backwards, the head of the metacarpal bone projecting forwards, in a boy æt. 10 years, extension completely failed after many attempts, although the patient was under the influence of chloroform. Reduction was, however, at last obtained by simple manipulation, rotating the thumb, the bone thus passing backwards through the torn capsule into its normal position.

Of compound dislocation at the metacarpo-phalangeal joint, I have no example, although it is at this joint that authors generally describe dislocation as being the most frequent. Of dislocation of the extreme phalanx I have three examples—two of dislocation backwards, and one forwards.

Case 58.—One of the former occurred in a labourer of irregular habits, æt. 24, who, having

fallen upon the point of his thumb, dislocated his ungual phalanx backwards, the head of the first projecting through the integument. As reduction was impossible, the head of the first phalanx was removed, and a dorsal splint applied. Rapid convalescence followed, and the man left in one month with a fixed joint.

Case 59.—The second case was in a man, æt. 20, who, when drunk, fell from a cart with his fingers extended. The last phalanx of his thumb was dislocated backwards, and protruded through the integument, producing a wound an inch long. The parts were firmly fixed by the flexor tendon and lateral ligaments. Before reduction could be accomplished these were divided, and water dressing employed. After two weeks a splint was applied, and the wound healed, and he left in a month with a stiff joint.

Case 60.—The third case was in a male adult, and was produced by a fall upon the palmar aspect of the top of the thumb. The base of the last phalanx protruded forwards. The dislocation was reduced with ease by simple extension, and a dorsal splint was applied. The man rapidly recovered with a stiff joint.

In such cases the treatment is not complicated, although at times it may be difficult. The parts, unless as in Case 56, should always be preserved,

even when it may appear almost hopeless; but as long as there is a chance of saving it the attempt should be made.

In Case 58 the head of the first phalanx was required to be removed, and in such injuries such treatment is not infrequent, although occasionally by dividing the lateral ligaments reduction will be permitted. In others, as in Case 59, these lateral ligaments, with the flexor tendons, form the impediment; division of both may then be called for. In some cases reduction will be completed by manipulation, or by simple extension (Cases 57 and 60), either with or without chloroform; in others, the pressure by the thumbs upon the protruding part; extension by means of plaster applied to the extremity; the clove hitch or key may be resorted to. Whatever means may be required to obtain reduction must be employed, amputation being out of the question, but excision may be of great value. After cicatrization of the wound some mobility may be allowed with the hope of forming a false joint; this is not a frequent termination; but the fact that such may occur should encourage the surgeon in making the attempt.

Case 61.—A man, æt. 22, in a fall produced compound dislocation of the terminal phalanx of the thumb backwards, with a wound over the palmar aspect of the joint. The head of the bone was *excised*, and in two weeks the wounds had healed, the man leaving the hospital with a moveable joint.

Case 62.—A man, æt. 31, received a lacerated wound from a circular saw into the joint of the thumb, between the first and second phalanges. The joint was excised, and a splint applied; the wound rapidly healed, and mobility was enforced, and the man left the hospital with a moveable joint.

In compound dislocation and fractures of the fingers, if the parts are not so completely disorganised as to preclude all hope of their recovery, and the tendons are not destroyed, an attempt should be made to preserve the limb, with the hope that complete recovery may ensue. The parts should be replaced in their natural position, and circular strips of linen or lint applied, commencing from the extremity upwards. Splints are occasionally, but seldom required, as the lint is enough in most cases to preserve rest and the adaptation of the parts; cold, by irrigation, should then be used with the hand raised upon a pillow.

The constitutional treatment required is generally very slight: nutritious and unstimulating food in the early stage, with sedatives; in the latter, tonics and stimulants. Purgatives only when required, besides the general rule to attend with care to the secretions. Under such treatment cases will generally do well; if after a time the hope of preserving the joint has disappeared, and the finger would be likely to prove an impediment to the occupation of the patient, amputation should be considered; to allow the parts

to heal and then to amputate can only be regarded as waste of time.

Relying, then, with some confidence upon the powers of nature to restore a wounded joint to its natural condition, let the surgeon betimes well consider when this hope may with propriety be discarded; and weighing well the advantages and disadvantages which an anchylosed joint may prove to the patient, let him not waste valuable time by delaying the removal of a part which will be found upon recovery "contracted, bent, motionless, or otherwise useless."

CHAPTER VI.

SIMPLE DISLOCATION.

Section I.

Dislocation of Clavicle.

The subject of simple dislocation is the next that claims our consideration; and, as it is not my intention to describe all the different symptoms by which each form may be distinguished, nor to write what can be easily found in any of the ordinary surgical class books, but rather to give my professional brethren some knowledge of what the clinical experience of Guy's Hospital affords to any one willing to glean materials within its walls, I shall divide my subject into chapters upon dislocation of the upper and lower extremities, and give in short notes the history of cases which illustrate the subject, or which present any peculiar points of interest; at the same time making such remarks upon the cases, either as a whole, or individually, as may render them of more service in a practical point of view.

Commencing at the clavicular articulations, I have four cases:

Case 63.—One of dislocation of the sternal extremity forwards in a boy, æt. 13, who was run over; some difficulty was experienced (as is generally the case) in the treatment, but by means of a good pad over the part, and a figure of 8 bandage, the bones were kept in apposition, and the boy left the hospital convalescing.

Case 64.—The second case was one of dislocation of the sternal end of the clavicle backwards in a man, æt. 52, who received the injury from a load of bricks falling upon him. He was admitted with fractured ribs upon both sides and dislocation of the sternal extremity of the left clavicle backwards. He was so much injured in the chest that an attempt at reduction was not made at the time, but the following day the bones were found to have returned to their normal position; a bandage was applied, and the man left well.

Case 65.—The third case was one of dislocation of the acromial extremity of the clavicle upwards, with comminuted fracture of the acromion process; it occurred in a man æt. 49, from a fall upon the shoulder. The arm was bandaged to the side, and raised as much as possible, and moderate pressure applied over the dislocated bone. The man progressed well and left the hospital convalescent.

Case 66.—The fourth was a simple case of dislo-

cation of the acromial end of the clavicle upwards in a man, æt. 40, from a fall upon the shoulder; by a pad and bandage the dislocation was reduced and he left well.

These cases are examples of the forms of dislocation of the clavicle which are generally met with, and illustrate the treatment which should generally be pursued. But it must not be supposed that similar treatment will answer in all cases; the scientific surgeon must not bind himself to a peculiar method in the treatment of any form of dislocation, but must be guided by the symptoms and difficulties of each case; each one will generally present some peculiarity, and some difficulty to overcome; and, as a consequence, the treatment (if it is to be successful) must be moulded or adapted to its peculiar wants. In one case a line of treatment will prove of service, which in another will be useless, if not injurious. The principles of treatment will then be the only true guide to the surgeon, and his practice (if it is to be successful) must be the result of their careful consideration.

Section II.

Dislocation of the Shoulder-joint.

The frequent occurrence of dislocation of the shoulder-joint renders the consideration of the sub-

ject of peculiar interest: it is an accident which comes before the notice of the surgeon at all times and being an emergency requires prompt and energetic treatment; an oversight brings disgrace upon the surgeon and inflicts a lifelong source of anxiety and inconvenience upon the patient.

My notes of cases furnish me with twenty-three examples of dislocation downwards, five of dislocation forwards, and seven of the two former combined, together with one of dislocation backwards.

These thirty-six examples illustrate the whole subject of dislocation of the shoulder-joint; downwards, forwards, and backwards being the only possible directions in which the head of the bone can pass. It is true, there may be instances where the bone may pass midway between the points above indicated, and I have cited seven cases where such was the direction taken; and although it is necessary to divide all subjects into general divisions, in order to understand them, and to explain and give directions for their treatment, still, there is no doubt, that practically such arbitrary rules are constantly deviated from, and that in dislocations of such a moveable joint as the shoulder, the head of the bone may be dislocated, and rest upon any portion of its fixed articulating surface.

TABLE OF DIAGNOSIS.

Containing the chief Diagnostic Symptoms of Dislocations of the SHOULDER-JOINT.

Downwards into the Axilla.	Downwards and forwards beneath Coracoid Process.	Forwards beneath Clavicle.	Backwards upon the Dorsum of Scapula.
Deltoid flattened and stretched	Deltoid flattened, mostly behind	Deltoid but slightly flatteued behind	Deltoid not much altered.
Acromion process projecting a great deal	Acromion process projecting a little	Very slight projection of acromion	Anterior surface of shoulder easily depressed.
Subclavicular depression natural	Subclavicular depression diminished	Head of bone felt beneath clavicle	—
Head of humerus felt in axilla	Head of humerus indistinctly felt beneath coracoid under pectoral muscles	Head felt beneath clavicle, and not in axilla	Head felt beneath spine of scapula under the acromion.
Limb lengthened	Limb about normal length	Arm shortened	Arm lengthened.
Elbow projecting from body	Elbow but slightly projecting from body	Elbow close to body, and carried back	Elbow close to body, and carried forwards.
Anterior wall of axilla lengthened	Anterior wall slightly projecting forwards	—	Anterior wall easily depressed, having lost its support.
Motion painful, particularly abduction.	Painful.	Very slight.	Very slight.

Mode of production.—In thirty-three out of the thirty-four cases the cause of the injury was a direct fall upon the shoulder, either forwards, backwards, or outwards; in two instances only of dislocation downwards, and in one of dislocation downwards and forwards, was the bone displaced by a fall upon the extended arm. It is thus clear that a direct blow upon the bone itself is generally the cause of the dislocation.

Sex.—In thirty cases they were males, and in six females.

Period of life.—The period of life at which dislocation of the shoulder is most liable to occur is evidently past the middle age; it might have been expected that in old age fracture of the bones would have taken place rather than dislocation, from their greater brittleness; but the facts demonstrated below prove the correctness of the former opinion.

3	cases were	under	20	years	of age.
5	„	between 30	„	and	40
5	„	„ 40	„	„	50
12	„	„ 50	„	„	60
10	„	„ 60	„	„	70
1	„	„ 70	„	„	80

The youngest was 13, and the oldest 74; and it may be observed that no instance occurred between 20 and 30.

Treatment.—The treatment of dislocations since the introduction of anæsthetics has comparatively

become an easy task; the muscles of the dislocated joint, when the patient is fully under the influence of chloroform, offer no serious impediment to the reduction of the bone, and as a rule the bone may be easily replaced; yet at times much difficulty is experienced, and for the explanation of which some other cause than the spasm of the muscles must be found. There is no doubt that the cause is a mechanical one; and it must be evident that it is not in the bones themselves, as in the shoulder-joint the bones can be easily moved in any direction, but yet cannot be replaced. The only source of obstruction must then exist in the soft parts, and the capsular ligament itself must surely be that impediment; the head of the bone has been pushed through its capsule, and the obstacle to its reduction in early cases consists in the difficulty to return it through the rent made in this moveable capsular membrane.

In fifteen of these cases of dislocation reduction was completed with ease, under the influence of chloroform, within twenty-four hours, and in eight of these within six hours, by simple extension with the heel in the axilla.

In one case, of a man, æt. 68, in which the bone was dislocated forwards, an attempt to reduce it by extension without chloroform failed, but at once succeeded under its influence.

One case of dislocation downwards was reduced upon the 4th day, and a second upon the 11th, and

a third upon the 14th, by simple extension and chloroform.

In two patients, both æt. 50, reduction was effected after six weeks by similar treatment; and in three, aged respectively 63, 60, and 19, all attempts at reduction failed after the second month.

A simple plan of reduction proved successful in a case of dislocation downwards, which is worthy of record, as it has in several instances proved practically of great value, and from its simplicity is calculated to be of interest.

Case 67.—A man, æt. 41, when drunk fell upon his right shoulder; dislocation of the head of the humerus downwards was the result; the man did not seek advice for three weeks, when he applied to Guy's, with the symptoms well marked. Chloroform was administered, and the arm extended at a right angle to the body; the surgeon then placed his right hand upon the scapula to fix it, and the thumb in the axilla, pressing upon the head of the bone. With his left hand having applied extension, he suddenly brought the arm down over the chest, and then by a sudden movement the head of the bone snapped into its natural position, the thumb acting as a fulcrum. In two other cases the same method was adopted with success, one of dislocation downwards in a man, aged 58, and the second of dislocation downwards and forwards (sub-coracoid) in a woman, aged 23, seventeen hours after injury, in which the

treatment by extension had failed. Since the above was written, an example of dislocation downwards of five weeks' existence was reduced by the same simple method in a man, aged 48, on whom several unsuccessful attempts had been made before he applied to me.

A method of reduction is exemplified in the next case to be related, which I believe is of some novelty, and is certainly worthy of trial in old cases, where the ordinary attempts fail to reduce the dislocation; its simplicity also is a strong recommendation.

Case 68.—A man, æt. 32, having, twenty-five days prior to his admission into Guy's under the care of Mr. Cock, fallen out of a cart upon his shoulder, dislocated the head of the humerus downwards. Several attempts at reduction had been made, but without success. When admitted, chloroform was given, and extension at all angles made without benefit; an air-pad, made of vulcanised india-rubber, was then placed in the axilla, and the arm firmly bandaged to the side; the air-pad thus being made to exert a powerful outward pressure upon the head of the bone. Upon removing the bandage upon the third day, the head of the bone was found to have returned to its natural position. The man was unconscious of any sudden snap, which is generally experienced in the reduction of dislocations; and it is probable that in this case no such

sudden movement had taken plaee; the regular and steady prcssure upon the head of the bone probably prcssed upon thc eapsular ligament, which was the real obstaele to thc reduction; and this at last gave way, and pcrmitted thc bonc gradually to assume its normal position. Whatevcr way, however, we may wish to account for it, the end was a good one, and the mcthod is worthy of remembrance and repetition in similar eases.

Case 69.—A case of dislocation of the humerus forwards, remains to be rclated, complieated with fracture of the elavicle and ribs of the same sidc; it occurrcd in a man, æt. 61, from a fall upon the shoulder from a height. The dislocation was redueed, three hours after thc injury, by extension with thc heel in the axilla, and the parts bandaged. Convalcscenee specdily followed.

In these eases of dislocation, complieated with fracture, mueh difficulty is oftcn experienced in their trcatment; the dislocation should always, if possible, be reduced at once, and the fracture subsequently treated; the method of rcduction must be adapted by thc surgeon to the wants of the individual ease, no general mcthod being applieable. In the following ease, however, of disloeation of the head of thc humerus into thc axilla, with fraeture through the neek of the bone, rcduetion was found impossible.

Case 70.—The case has been published by Mr. Cock, in the 'Guy's Hospital Reports,' vol. i, 3d series. It occurred in a man, æt. 42, who had fallen from a considerable height upon his shoulder. When admitted, the joint presented the ordinary symptoms of dislocation into the axilla. Chloroform was given, and an attempt at reduction made, when it was at once discovered that a fracture existed through the neck of the humerus. All attempts to force the head back into the glenoid cavity completely failed. Considerable inflammation and swelling followed this operation; but at the expiration of a week, when this had subsided, a fresh effort at reduction was made, but with a similar result. "As soon as the muscles recovered their tonicity, the end of the shaft resumed its position in the glenoid cavity, and I ordered the man to get up and walk about with his arm in a sling, and to use a moderate degree of motion at the shoulders, with the view of preventing any distorted union from taking place between the head and the shaft; and also for the purpose of encouraging the formation of an artificial joint between the latter and the glenoid cavity." The man experienced but little further pain or inconvenience, and left the hospital with the injured arm two inches shorter than that of the opposite side. Mr. Cock afterwards learned that he had regained considerable use of the limb, but had had no opportunity of ascertaining the condition of the shoulder, or the degree and extent of motion of which it is capable.

In old cases of dislocation, in patients advanced in life, if fair mobility is present, an attempt at reduction should not be made, as the injury which is almost certain to be produced by violent extension will probably be more injurious than the evils of a dislocated bone, particularly when the head of the bone has already partially accommodated itself to its new position. In two cases of dislocation downwards in patients 60 and 50 years of age respectively, this line of treatment was adopted; the bone had been displaced nine and seventeen weeks, and fair mobility existed; the hope of reduction being small, the patients left unrelieved.

A third case also of dislocation backwards upon the dorsum was not treated for similar reasons; it was in a man, æt. 66, and was of two months' standing, and the bone had accommodated itself to its new position, good movement being experienced. In like instances a similar line of treatment should be adopted.

Reviewing the whole subject of dislocation of the shoulder-joint, we may mark the following conclusions as being worthy of remembrance:

1. The necessity of making an early and correct diagnosis.

2. That the head of the humerus may be dislocated in any position downwards, backwards, and forwards, these directions being the only possible ones into which the head can pass.

3. That dislocation downwards is by far the most common form; and dislocation backwards the least.

4. That a direct blow upon the shoulder is by far the most frequent cause of dislocation.

5. That dislocation of the humerus is more common in old people than in young and middle-aged.

6. That it is most frequent in men.

7. That reduction is comparatively an easy task under the influence of chloroform.

8. That spasm of the muscles is not the principal impediment to the reduction of the bone; but that the lacerated capsular ligament may be regarded as the chief obstacle.

9. That simple extension with the heel in the axilla, when the patient is under the influence of chloroform, is generally sufficient to reduce the bone; in many cases the treatment by manipulation as described will be followed by success.

10. That up to six or seven weeks the chances of reduction may, as a rule, be considered good.

11. That reduction may be effected at any period after two months, but the chances of success are small.

12. That in old people, when the bone has been dislocated some weeks, and fair mobility exists, it is hardly expedient to attempt reduction.

13. That in old cases, and in others where reduction by extension or manipulation has failed, the

treatment previously described of steady and constant pressure upon the head of the bone, by the adaptation of an air-pad to the axilla, should be employed; as being simple it can do no harm, and may succeed in other cases as well as in the example given.

CHAPTER VII.

DISLOCATIONS OF THE ELBOW-JOINT.

Recalling the anatomy of the elbow-joint, and observing how firmly the bones are adapted and knit together, it may well be a source of wonder to the student that dislocation of the elbow should be so frequent, or, indeed, take place at all; particularly when a little observation has taught him that fractures of bones occur from such slight causes. But as facts are what we, as surgeons, have to deal with, and since, as practical men, we are all called upon to relieve the infirmities, and treat the accidents to which humanity are liable, we must not allow ourselves to stop and speculate upon their causes, but apply ourselves with all industry and sincerity to inquire into what has taken place, and to deduce from the experience of the past such knowledge as will assist us in the future practice of our profession.

Reviewing then the subject of dislocation of the elbow-joint, it will be seen that the radius and ulna may be together dislocated backwards, outwards, or inwards; that the radius may be displaced alone,

either backwards or forwards; and that the ulna may be dislocated backwards; dislocation forwards, unattended with fracture of the olecranon, being impossible.

Out of thirteen cases of dislocation of the elbow-joint, which my notes afford to illustrate the subject, there are five cases of dislocation backwards, and in one, fracture of the coronoid process existed; five of dislocation outwards, and in one the external condyle of the humerus was fractured; one case of dislocation of the radius backwards, and two forwards. I have no instance of dislocation of both bones inwards, or of dislocation of the ulna backwards, these forms of dislocation being comparatively of rare occurrence.

Ages.—The ages at which dislocation of the elbow may take place it will be seen are variable, but it is most frequent in early life:—

6 of the 13 cases were between			10	and	20	years of age.
3	„	„	20	„	30	„
3	„	„	30	„	40	„
1	„	„	40	„	50	„

Sex.—In one instance only was the subject a woman.

Diagnosis.—A correct diagnosis of the above injuries to the elbow-joint may generally be made without much trouble, if the case is seen at an early period after the accident, a projecting bone in one direction or another, or an unusual depression, fairly indicating

the form of dislocation; but, if time has elapsed, and much effusion has taken place, the diagnosis becomes a task of some difficulty, and a correct one in certain cases absolutely impossible.

The joint should always be carefully examined, each point of bone felt for, and its position compared with the sound limb; and, although in all forms of dislocation the surgeon should carefully compare the sound with the injured joint, in none can he derive greater assistance, or feel more forcibly the value of the rule, than in the dislocations of the elbow. The student should accustom himself to the manipulation of healthy joints, and learn where to place his finger upon their different prominences and depressions, and having learned the normal conditions of a joint, he will find but little difficulty in discovering when a displacement has occurred.

In dislocation of both bones backwards, the abnormal projection of the olecranon backwards, and the forward position of the humerus, indicate clearly the form of injury; and in dislocation of the ulna alone, the same symptoms, with the pronation and twisting inwards of the hand, as clearly point out the character of the dislocation. In dislocation of both bones outwards or inwards, from the abnormal projection of the outer or inner condyles of the humerus the surgeon may fairly infer the direction of the displacement; and in dislocation of the radius backwards, the head of the bone being felt in such an

unusual position; and in dislocation forwards, its absence from its natural one, will generally lead the surgeon to a correct opinion.

In all cases the forearm will be more or less flexed upon the arm, mobility will be diminished in various degrees, and the function of the joint completely in abeyance.

When from effusion the points or landmarks of the joints are invisible, the difficulty of diagnosis will, indeed, be great; and in cases where such is experienced, the surgeon must wait till the effusion has diminished, and be ready, upon the earliest opportunity, to diagnose, and thus to treat correctly the injured limb.

Treatment.—Having clearly made out the form of injury which the joint has sustained, the treatment must form the next and most important consideration. In all cases chloroform should be administered, as the force which is generally required is considerable, and all opposition should, if possible, be prevented.

The arm being then fixed by an assistant, and the forearm grasped by a second, in dislocation of both bones, or of the ulna alone, extension should be made in the line of the angle at which the joint is fixed, or at a more acute one; and the surgeon, by pressing the projecting bone in the direction required, or manipulating and slightly moulding the

injured joint, will generally sueeeed in the reduetion by a sudden and foreible flexion of the limb.

In disloeation of the radius forwards, simple extension from the hand proves quite suffieient, and in disloeation baekwards flexion and pronation.

By similar treatment all the reeent eases whieh I have before me were sueeessfully redueed, and one of disloeation of both bones outwards, seven weeks after the injury, in a man aged 38, in whieh ineffeetual efforts had been made at the time. But a seeond ease of disloeation outwards of seven weeks standing, in a woman aged 22, was treated without sueeess. The disloeation of the radius forwards, in boys of eleven and twelve respeetively were reeent, and were produeed by a fall upon the extended hand, and were redueed by simple extension. The example of disloeation of the radius baekwards, in a man aged 29, although of a month's duration, was sueeessfully treated by flexion and pronation.

In old dislocations of the elbow-joint the ehanees of reduetion are not so good as in disloeation of the more moveable joints; the parts readily, and at an early period, aeeommodate themselves to their altered position, and therefore more foree is required to move the bones, and the ehanees of the parts reeovering their normal eondition beeomes less favorable. No rule ean be given when the attempt should be made, as eaeh ease stands upon its individual merits. In young people the ehanees of sueeess are greater than in old, and the indueements to obtain reduetion

are stronger. When good movement has been obtained, the inducements for making the attempt are weakened; and a treatment which would destroy such a favorable condition, for the uncertainty of supplying a better, would not be rational.

The age, the social position of the patient, and his occupation, are considerations which should influence our practice; but as a rule, if the desirability of the reduction is very great, and the chances favorable, an attempt should be made to reduce the dislocation, even after the expiration of many months. But if the injury is not a serious impediment to the patient, and the mobility is tolerable, even after the expiration of a few weeks only, an attempt at reduction would be hardly expedient; as the mobility is sure daily to improve, and the certainty of a useful arm is not to be jeopardised, with the poor chances of giving a better one.

The operation of tenotomy in these cases is one which is worthy of serious consideration; cases have been reported, where after division of the triceps tendon considerable advantage has been gained, and although I am unable to speak upon this point from personal experience, I believe there may be old cases of dislocation where the joint is at a bad angle, and mobility absent, in which much benefit may be obtained by such an operation. I should most certainly perform it in certain instances, and consequently recommend it to the careful consideration of my professional brethren.

CHAPTER VIII.

DISLOCATIONS OF THE WRIST.

Dislocations of the wrist-joint are not common forms of accident, fracture of one or both bones resulting from a fall much more frequently. Still they do take place, and they may be described as follows:

The hand at the wrist-joint may be dislocated backwards or forwards, the ends of the radius and ulna projecting either in front or upon its dorsal aspect. In the former case the dislocation is produced by a fall upon the palm of the hand; in the latter by a fall upon its dorsum.

There is no difficulty in the recognition of the injury, the unnatural protrusion of the bones in either position clearing marking out its character; and the reduction is also accomplished with ease, simple extension being generally sufficient. The hand may also be dislocated backwards off the radius alone; and the ligaments which bind the extremity of the ulna in its place may be ruptured, allowing it to project backwards, or to be dislocated. In the former case the diagnosis is not obscure. The hand will be twisted outwards, and the extremity of the radius

will project in front of the carpal joint; a little moderate extension from the hand, and slight local pressure over the displaced bone will generally, with ease, cause replacement of the bones, and rest in splints, with the application of some cold lotion for a fortnight or three weeks, will generally subdue all attempts at inflammatory action. The joint, after this, or any other injury, will not rapidly become restored to its natural condition, and some weakness will be experienced for many weeks, but by care it will eventually perfectly recover.

When the carpal extremity of the ulna is displaced from its normal site, there is always much difficulty in maintaining the bone in its natural position, although there may be none in replacing it; but immediately the pressure is removed from the part the displacement returns; the only treatment is the constant application of a band round the wrist, with pressure over the protruding bone.

These cases of dislocation of the wrist are not often admitted into hospital, and during the last five years I have no record of any; they are not, however, uncommon amongst the out-patients; but as they are not difficult either to recognise or to treat, it is needless to give cases as illustrations.

There is one form of injury to the wrist which, however, may be mistaken for simple dislocation, and that is, fracture of the lower end of the radius at its epiphysis; it is generally produced by a fall upon the palm of the hand, the extremity of the radius

yields, and the hand with the fractured portion of bone is pushed backwards, giving rise to a protrusion over the dorsal aspect of the wrist, the accident may be mistaken for a dislocation, but if the attention of the surgeon is directed to this source of error, a careful examination will reveal the true state of affairs, the solution of continuity between the fractured bones will soon be discovered, and a mistake avoided. Authors also describe dislocations of the os magnum, and of the cuneiform bone; but I have not been fortunate enough to meet with an example of either form. The diagnosis is said to be easily made; a projection of the bones upon the dorsal aspect of the wrist taking place when the hand is flexed. The treatment should consist in absolute rest of the joint with the hand fixed upon a splint, and the bones kept in apposition by pressure when necessary, time being allowed for nature to repair the laceration of the ligaments. The thumb and fingers may also be dislocated at any of their joints either forwards or backwards, and the latter is the most common; reduction is at times a task of some difficulty, but by extension by means of tape and some manipulation, it may generally be performed. Under the head of compound dislocation of the thumb and finger observations may be found applicable to the surgery of these cases.

CHAPTER IX.

DISLOCATION OF THE HIP-JOINT.

If from the amount of the literature of any subject we can fairly deduce any conclusions as to its importance, the claims of dislocation of the hip-joint to our most serious consideration will not be doubted; for surgeons of great eminence have given a large proportion of their attention to its investigation, and have accordingly supplied us with much valuable information. Recognising then, as I do, the industry of those great men who have handed down the result of their labours, and fully impressed with the importance of the subject I now am about to consider, I trust that the review of the cases which my note-book may yield will not prove unfruitful either in interest or in practical importance.

Commencing with an analysis of the materials upon which we are about to base our remarks, the cases may be divided into the following classes:

11	cases of dislocation backwards and upwards upon the dorsum.
2	„ „ „ into the sciatic notch.
3	„ „ forwards and downwards into the foramen ovale.
–	„ „ „ upwards upon pubes.
2	„ of partial dislocation upon lip of the acetabulum.
1	unknown.
19	

Ages.

5 cases under 20 years of age, the youngest being 8.
10 cases between 21 years of age and 40.
4 „ 40 „ 60, the oldest 55.

Sex.

17 were males and 2 females.

Diagnosis.—The diagnosis of the different forms of dislocation which are generally described by authors is not difficult; the symptoms which indicate each variety being tolerably well marked. The fixed position of the limb, its considerable shortening, and the inversion of the knee and foot, with the altered position of the trochanter (backwards and upwards), points out the dislocation upon the dorsum, and the same symptoms, only marked in a less degree, indicate that into the sciatic notch.

The lengthening of the limb, and bent position of the body, with the forward pointing position of the foot, renders easy the diagnosis of the dislocation downwards and forwards into the foramen ovale; and the fact of the head of the femur being felt upon the pubes, beneath Poupart's ligament, would alone indicate the form of displacement present. Still we occasionally meet with cases which will not altogether suit the descriptions of these different well-known forms, and we are tempted to the belief that the head of the bone may be only partially displaced, and may rest upon any part of the lip of the acetabulum.

It has been well pointed out by M. Nélaton, that the best method of determining the exact position of

the head of the femur consists in defining accurately its position relative to a line drawn from the anterior superior spinous process of the ilium to the most projecting portion of the tuberosity of the ischium. In its normal position, the great trochanter just touches this line, and this junction is maintained in any natural position of the limb; if then in injuries or diseases of the joint, when any doubt exists as to the fact of dislocation the trochanter is found in this its normal situation, the probability of a displacement is much diminished; if, upon the other hand, it is found to project above or behind this line, there is strong reason to believe that some dislocation has taken place.

TABLE OF DIAGNOSIS.

Containing the chief Diagnostic Symptoms of Dislocations of the HIP-JOINT.

Backwards and upwards upon the Dorsum.	Backwards and downwards upon the Ischiatic Notch.	Forwards and downwards into the Foramen Ovale.	Forwards and upwards upon the Pubes.
Projection of the buttock	Buttock projects down and outwards	Buttock flattened, depression over the great trochanter	Buttock flattened.
Fold of buttock elevated	—	Fold of buttock depressed	—
Head of femur felt in external iliac fossa	Felt over the ischium	Felt at the internal and upper part of the thigh in front of ischium	Felt in groin.
Trochanter elevated, and projecting backwards	Depressed, and projecting backwards	—	—
Thigh slightly flexed	Slightly flexed	Slightly flexed	Extended.
Adduction of limb	Adduction	Abduction	Abduction.
Leg rotated inwards	Rotated inwards	Rotated outwards	Rotated outwards.
Leg slightly flexed on thigh	Slightly flexed on thigh	Slightly flexed on thigh	Extended.
Leg shortened from half to one and a half inch	Lengthened from half to one inch in extension, shortened in flexion	Lengthened one to two inches	Shortened half to one inch.
Movements possible, except abduction and rotation outwards	Possible, except abduction and rotation outwards	Possible, except adduction, rotation inwards, and extension	Possible, except adduction and rotation inwards.

Treatment.—If I were to describe all the various appliances which have been employed at different periods to reduce the dislocations of the hip, I should take up a great deal of my readers' time, and perhaps weary them, without affording them any adequate compensation; but, as it is my wish to give my professional brethren such practical information as may be gathered within the walls of a large hospital, I shall content myself by describing such forms of treatment only as have been there employed with the cases, and their varied results.

The only constitutional means of reduction which were employed, was the administration of chloroform, and it is needless to dwell upon the value of such treatment; since its introduction the treatment of dislocations has become comparatively an easy task, and it should accordingly be employed in almost all instances. As to the local means, commencing with cases of dislocation upwards upon the dorsum, I have three cases, in which simple extension with a jack towel fastened above the knee, the pelvis being fixed with a perineal pad, proved successful. One in a boy aged 8, one hour after, the second in a man aged 55, ten hours after the accident, and the third in a boy aged 15, three hours after.

Case 71.—A second form of reduction, which may be called the "ready method," may now be illustrated by the case of a girl æt. 9, who being knocked down dislocated her hip upon the dorsum. She was ad-

mitted half an hour after the accident, and chloroform was administered; when she was fully under its influence the surgeon grasped the limb, with one hand upon the knee and the other upon the ankle; he then gradually and forcibly flexed the thigh inwards upon the abdomen, and secondarily by a rotatory motion abducted and suddenly extended it, when the head of the bone snapped into its normal position. A second case in a man aged 53, admitted half an hour after the accident, was similarly treated and with equal success.

To establish the value of the method as just described, two cases may be related, in which it proved successful after the old plan by extension had completely failed.

Case 72.—In a man æt. 24, who three hours prior to his admission had dislocated his left hip upwards upon the dorsum, chloroform and extension in the usual manner totally failed, but twenty-four hours after, under the influence of chloroform, by flexion, abduction, and rotation of the limb, the bone slipped easily into the acetabulum.

Case 73. — The second case was in a man æt. 45, who was admitted with a severe contusion of the right knee and thigh, received from a falling tree; some shortening and inversion of the same leg was observed at the time, but the man positively stated that such symptoms were only the result of an old injury,

received some years previously; when he began to walk about, however, his error was detected, and a dislocation of the femur upwards was diagnosed. Chloroform was given upon the thirty-fourth day after the injury, and violent extension by pulleys and rotation employed, but without benefit. The limb was then flexed and powerfully abducted, when the bone returned to its natural position, and a rapid recovery followed.

In opposition however, to the above, I have one instance where such treatment failed, but where the older method by extension succeeded.

Case 74.—It was in a man æt. 37, who dislocated his femur upwards; six hours afterwards, under the influence of chloroform, reduction was attempted by flexion and abduction and rotation, but without success, although the head of the bone had been moved in front of the acetabulum. Extension and rotation were then employed, with the desired result. This altered position of the limb is a point of some interest, as it would appear that this is the only form of dislocation, viz., forwards, in which the "ready method" is not applicable.

We have now to describe two cases, where all treatment was ineffectual; the bone could be reduced into its natural position, but immediately upon the removal of the extending force it became redislocated.

Case 75.—One was in a boy æt. 18, who was injured by the passage of a cart-wheel over his hip. Dislocation of the femur upwards was the result, which was reduced by simple extension; upon the sixth day, however, it was found to be again displaced, and renewed attempts at reduction by extension succeeded for a time, but upon its removal the bone returned to its abnormal position. All efforts to keep the bone in the acetabulum failing, a double inclined plane was ordered, and afterwards a long splint and weights over the bottom of the bed to preserve extension, but all without benefit, and he left the hospital six months after with a dislocated limb. He was re-admitted the following year, and had the tendo achillis divided, as this tendon had contracted from walking upon his toes. He left well able to walk with a high-heeled boot.

Case 76.—The second case was in a man, æt. 37, who dislocated his femur upwards of fifteen weeks prior to his admission; attempts had been made to reduce it five weeks after the injury, but without benefit. Chloroform and violent extension were applied, and the head of the bone was restored to the acetabulum, but upon removing the extending force it again became dislocated. All efforts failing to keep the bone, when reduced, in its natural position, a long splint was applied, and after some weeks' rest in the hospital he left.

Case 77.—The last case of dislocation upon the dorsum which I shall mention is one of twelve

months' standing in a man, æt. 30; good mobility existed, and as an attempt at reduction was sure to be followed by more harm than good the patient was discharged.

The treatment of the cases of dislocation *into the sciatic notch* differs but little from that which was so successful in the previous cases; two cases will be related to illustrate the subject, and both were treated in the same manner and with equal success. One was in a woman aged thirty-six, who was admitted one hour after the accident. Chloroform was given, and the dislocation reduced by flexion and adduction of the limb, with abduction and rotation outwards as previously described. The second case was in a man aged thirty-two, and eight hours having elapsed before treatment, the same means were adopted with equal success.

Of dislocation into the *foramen ovale*, two successful cases may be related similarly treated. One in a boy aged fourteen, three days after the injury; and the second in a man aged twenty-six, one hour after, in which case extension alone failed, but the flexion, abduction, and rotation at once succeeded. Both the above cases were produced by a fall with the legs apart.

Case 78.—A third case may be given of a man, æt. 27, whose limb was dislocated into the foramen ovale by a fall of fifteen feet off a load of hay upon

the hip; twenty-four hours after the accident, chloroform and simple extension with rotation of the hip proved effectual to reduce the bone. Cases of dislocation occasionally occur where all attempts at reduction fail, but where the bone itself by some sudden movement of the body becomes reduced; it is probable that these cases are only partial dislocations, and that, although difficulty is experienced in reducing them, the head of the bone only rests upon the lip of the acetabulum.

Case 79.—One example was seen in a man, æt. 45, who, when at work with his leg extended, was prostrated by a large mass of earth falling upon him. When admitted two hours afterwards, the leg was evidently thrown somewhat downwards, as indicated by the hollow in the inguinal region, pointing of the foot, slight flexion of the body, and immobility of the whole limb; still these symptoms were not so well marked as in dislocation into the foramen ovale. A prolonged attempt at reduction was made under chloroform by extension and rotation, but without success. The man went to his bed, and upon the third day when turning he felt something snap, and the leg was found to have returned to its right position.

I have incomplete notes also of a second case of a man aged thirty-eight, who was admitted with some form of dislocation of the hip, in which a similar

result took plaee; the bone becoming redueed when turning in bed.

Case 80.—As another example of partial disloeation of the hip, I will relate a ease of disloeation of the head of the thigh-bone under the anterior and inferior spinous proeess of the ilium, whieh has been published by Mr. Coek in the 'Guy's Hospital Reports' (vol. i, series 3d). It oeeurred in a man who, one year prior to his admission, had reeeived the injury by being eaught between a gate and a post. It was evident, says Mr. Coek, "that the head of the femur was not in the aeetabulum. The femoral artery was not sustained as it should be by the subjaeent struetures, and eould be pushed baek towards the hollow of the empty soeket. The troehanter was more prominent than natural, and had slightly advaneed towards the inferior spinous proeess of the ilium; the head of the thigh-bone eould be readily felt lodged between the aeetabulum and the superior spinous proeess of the ilium. He had regained little or no motion, and walked like a person whose hip had been anehylosed from disease."

Analysing the treatment of the previous eases as a whole, it will be seen that five eases, ineluding four of disloeation upon the dorsum, and one of disloeation into the foramen ovale, were redueed by *simple extension and rotation of the limb,* in one of these

the treatment by flexion, &c., having failed; that eight cases, including four of dislocation upon the dorsum, two of dislocation into the sciatic notch, and two into the foramen ovale, were reduced by *flexion, abduction, and rotation;* and that in three of these the treatment by extension had previously failed.

In two cases the bone was self reduced. In two all efforts to maintain reduction were fruitless, and in one old case no attempt was made.

To sum up as briefly as possible from the materials before our notice, the following conclusions may be fairly stated.

Conclusions.

1. That two thirds of the cases of dislocation of the hip are upon the dorsum.

2. That dislocation into the foramen ovale stands second in the order of frequency, dislocation into the ischiatic notch third, and dislocation upon the pubis last, this form being comparatively rare.

3. That dislocation may take place upon any part of the lip of the acetabulum.

4. That it is more frequent in men than in women.

5. That it is generally found in adults and middle age.

6. That the diagnosis of the well-known forms is not difficult, while that of the partial dislocation is often very puzzling.

7. That in all cases of reduetion whcrc the primary influence of the aeeidcnt has passcd away chloroform should bc cmployed.

8. That, as a rule, the method ealled the "ready method," as it requires no assistanee, should be tried in all cases, exeept that upon the pubis, as it has provcd to be the most suceessful in the eases related.

9. That in some eases extcnsion in the line of the disloeation and rotation will at once redнce the bone.

10. That in some instances one method will sueeeed when the othcr fails, without any apparent eause.

11. That in some eases all efforts will fail to reduee the bone, and in others to keep it in its plaee whcn redueed; that thesc cases must be treated by rest, and subsequently by gentle movements, to prevent stiffness of the joint, and to aid in the formation of a new one.

12. That in some rare instanees the bone will return into its natural position during some slight movcmcnt of thc body, as turning in bed.

13. That in old eases of dislocation whcn fair mobility is present, it is useless and inexpedient to attcmpt reduction.

CHAPTER X.

SIMPLE DISLOCATION OF THE KNEE-JOINT.

Dislocation of the knee-joint is by no means a common accident; the lower articulating surfaces may, however, be dislocated either forwards or backwards, inwards or outwards; in the two former cases the dislocation is generally a perfect one, in the two latter it is but partial.

The diagnosis is not a difficult one, the projection of the prominent portions of the bones in abnormal positions correctly indicating the form of injury. I have, however, seen but one example, and that is a good one, of dislocation forwards.

Case 81.—It took place in a man, æt. 22, who fell from the height of seventeen feet, but cannot remember how he fell. He was admitted into the hospital half an hour after the injury, under the care of Mr. Hilton. The leg was found in a straight position, and the foot slightly everted. The tibia was projecting forwards in a marked manner, and the condyle of the femur backwards in the popliteal space. The internal condyle was also somewhat

prominent, as if the dislocation was also slightly outwards. There was not much pain in the part, or much effusion. The left radius was also fractured.

The reduction of the dislocation was easily performed; chloroform was administered, and upon moderate extension being made, the bones slipped into their normal position. A posterior splint was at once applied, and the joint kept cool by spirit lotion. Everything progressed well, and upon the twenty-fifth day the splint was removed; the mobility of the joint was perfect, but too free—lateral motion being easily produced; a stout bandage was consequently applied to preserve the parts in the required position, and in another month he left the hospital, with his knee still kept in a straight position.

The principles of treatment, as applied to the example just quoted, are such as should be employed in other cases of dislocation of the knee-joint. Under chloroform, reduction of the bones can never be a task of difficulty, and perfect repose and immobility of the joint are necessary to give time for nature to repair the injury. The firm ligaments which bind the bones together having been ruptured, it is probable that much weakness of the joint will subsequently be always experienced, and, as a consequence, artificial support such as bandages will be required.

Dislocation of the head of the fibula also occasionally takes place. The following example came under my observation when acting as dresser to the late Mr. Aston Key (Case 82). It was in a lamp-lighter, who in falling off his ladder caught his foot between the bars. With the fibula placed upwards, the weight of the body pressing down caused the head of the bone to be wrenched from its natural position. The dislocation was very marked, the head of the fibula projecting outwards in a very prominent and characteristic manner. By pressure over the part, and eversion of the foot, the bone could easily be reduced; but the difficulty consisted in maintaining it there. A splint and pad were first applied for some months, but as soon as they were removed the dislocation returned, and, after some months' residence in the hospital, the man left, with orders to keep a firm strap constantly applied over the head of the bone, which preserved the bone in its right place, and gave comfort to the patient.

Dislocation of the patella, also, is not a frequent accident, although it is more common than either of the two former. It may take place outwards or inwards, the former being the most common; the oblique inward position of the femur, and the tendency which the extensor muscles have when acting powerfully to produce such an accident, accounting for this difference. In dislocation inwards a direct blow is generally the cause. The patella

may also be dislocated and everted, the bone standing upon its edge.

The accident is simple in its treatment; the surgeon has only to relax the muscles acting upon the bone by raising the leg in its extended position, and slight manipulation will restore the bone. The joint must be preserved at rest by a posterior splint, and inflammation subdued by cold lotions, leeching, and other applications as may be useful in gaining such an end. Weakness of the joint is generally a result of the accident, and there is a tendency always to its repetition, a good strong knee-cap should consequently be subsequently worn, to prevent this taking place, and to give support and comfort to the patient. The ligamentum patellæ, and the tendons of the extensor muscles, may be ruptured, producing a dislocation.

CHAPTER XI.

DISLOCATIONS OF THE ANKLE.

The majority of authors who treat of dislocations of a joint agree in one thing, and that is, to describe the injury as dislocation of the most moveable and distant portion of the articulation. When the shoulder is the joint affected, it is dislocation of the head of the humerus; when the elbow, of the ulna and radius; when the hip, the head of the femur is described as being dislocated; and when the knee, the tibia and fibula; and yet, when they describe the dislocations at the ankle-joint, they talk about dislocation of the tibia and fibula, and not of the ankle or foot.

It is always a subject of regret when any generally received arrangement, or method of description, is materially altered, as it tends to confuse both writers and readers; but when an exception to a general rule is made only from habit, as appears to be the case in this instance, and when experience has proved how puzzling this departure from the ordinary method is to students, I do not hesitate, in the following pages, to apply the same method of

description to the dislocation of the ankle that has been pursued in other articulations, believing that the change is decidedly in favour of a clear understanding of the subject.

The foot at the ankle-joint may be dislocated outwards or inwards, forwards or backwards. The two former are the most frequent, the two latter are somewhat rare forms of injury. To allow of dislocation of the ankle outwards or inwards, a fracture of either the internal or external malleolus generally takes place; the reasons for this are tolerably evident when the structure of the ankle-joint is remembered. No lateral motion of the joint is allowed, the bony supports afforded by the two malleoli and their powerful ligaments preventing any such mobility.

If the foot is dislocated *outwards* at the ankle-joint, the astragalus facing inwards presses upon the inner malleolus which projects, and the fibula, as a rule, is fractured above the ankle; the sole of the foot is turned out, and the inner edge of the foot downwards. In some instances the inner malleolus is also fractured, and in others the tension may be so great, that the integument gives way, and the tibia projects inwards, exposing the ankle-joint. In severe cases both tibia and fibula may project inwards, the foot being completely dislocated outwards. Such cases are described by authors as dislocation of the tibia inwards.

When the foot is dislocated *inwards*, the accident is produced by a fall upon the outer edge of the foot

turning the sole inwards, and the astragalus consequently presses firmly against the outer malleolus. To be perfect, the inner malleolus must be fractured, and the outer may also experience a like injury. In the case of a boy ten years of age, which has taken place at Guy's Hospital whilst these pages were passing through the press, this injury was most perfect, the extremities of both malleoli were broken off, and the articulating surfaces of the tibia projected through a wound upon the outer side of the ankle. The foot was completely twisted inwards, and at a right angle to the inner aspect of the limb. Under chloroform the dislocation was reduced, and the limb fixed by splints, wet lint and ice being applied to the wound. Cases like the last are described by authors as dislocation of the tibia and fibula outwards.—The foot may be dislocated *backwards* either as a whole or only partially; the heel will then project to an extent varying with the completeness of the dislocation, and the foot will appear proportionally shortened; the toes will also point downwards. The movements of the joint will be considerably lessened, and the dislocation may be complicated with fracture of the fibula. This form of dislocation has been described as dislocation of the tibia and fibula, or the former alone, forwards.

The last form of dislocation of the ankle is very rare; it has been described as dislocation of the tibia backwards, but, in the present pages, it will be denominated dislocation of the ankle and foot forwards;

it is generally only partial, but complete dislocation may take place. The symptoms are the opposite of those previously given; the foot becomes elongated, and the heel shortened. The tibia and fibula will evidently be found resting either partially upon the articulating surface of the astragalus, or if the dislocation should be complete, they will be more posterior. The foot is bent and immovable.

Treatment.—The treatment of these cases at times presents great difficulty, more particularly that of the two latter forms of dislocation.

In one and all, the leg should be well flexed upon the thigh to relax the gastrocnemius and flexor muscles, the foot should then be gradually extended, with one hand grasping the heel and the other the instep, and then by a little careful manipulation, which the exigencies of each case will suggest, reduction will generally follow; when difficulty is experienced chloroform should be given, and under such treatment success may fairly be anticipated. The parts should then be preserved in the natural position by means of splints or sand-bags, and cold lotions or ice applied. In the two latter forms of dislocation, however, this treatment is not so efficacious. If the dislocation can be reduced, it is generally an impossibility to keep the parts in their natural position, the flexors acting upon the foot having a constant tendency to reproduce the original displacement. Under such circumstances the prae-

tice of tenotomy becomes of great value; when the tendo-Achillis is divided, all opposing forces become paralysed, the surgeon can then replace the bones in their required position, and with ease preserve them there. Such an operation should, then, be performed when difficulty is experienced in reducing the dislocation, and also when the same difficulty is felt in the attempts to maintain the joint in the required position. In compound dislocation, similar principles of practice are to be employed, with the addenda suited to the severity of the injury which have been alluded to in another page. I might quote cases to illustrate this subject, but it becomes unnecessary, and will only refer the reader to a valuable paper by Mr. Cock, in the first volume of third series of 'Guy's Hospital Reports,' upon this subject.

CHAPTER XII.

DISLOCATIONS OF THE FOOT.

The consideration of the anatomy of the foot, and more particularly of the firm manner in which the numerous bones are bound together, would naturally lead the reflecting surgeon to expect that dislocation would be a rare form of injury; and also that, when it does take place, the act of reduction would be no easy task.

In practice such is found to be the case, and, since I am not disposed, as it would lead me from my original intention, to write a lengthened chapter upon such accidents, or to borrow from the works of different authors the many curious examples of such injuries, I shall merely confine myself to the examples taken from my own note-book, and make any practical remarks which these cases may tend to illustrate.

The first case which I shall quote is one which was admitted upon August 15, 1857, under the care of Mr. Hilton, of dislocation of the astragalus *forwards*.

Case 83.—A man, æt. 43, having fallen off a ladder the distance of five yards, lighted upon his feet, the right one coming edgeways upon a brick. When admitted the foot was fixed, and the head of the astragalus was projecting in front and to the inner side of the foot, having evidently been shot out of the tibio-fibula articulation forwards and inwards. Chloroform was given, and attempts at reduction made without success; the tendo-Achillis was divided by Mr. Forster, and fresh attempts made without success. The case was about to be given up, when a third effort succeeded, the bone slipping into its normal position. Ice was applied for a few days, and the leg then put up in side splints. A superficial cutaneous slough separated where the head of the astragalus had pressed, and the man left convalescent after seven weeks, with some mobility of the articulation.

A second case, with a different termination, has now to be related, occurring in the practice of Mr. Birkett, and already given in Mr. Cock's paper, as quoted previously.

Case 84.—A man, æt. 45, fell from a height, and alighted on his right foot. When admitted there was a well-marked dislocation of the astragalus forwards. There was severe ecchymosis of the soft parts upon the inner side, and the integument much stretched over the projecting head of the astragalus;

the foot was twisted eompletely outwards. Chloroform was given, but attempts at reduetion failed. The tendo-Achillis was next divided, but without sueeess. The integument over the bare bone subsequently sloughed, and upon the thirteenth day Mr. Birkett took out the astragalus; the wound took on an unhealthy action, neeessitating amputation, on the twenty-sixth day, and from this time the man happily eonvaleseed.

These two eases are fair examples of the results of dislocation of the astragalus. The diagnosis of the aeeident is not diffieult, the abnormal projection of the bone fairly leading the surgeon to recognise the form of injury. As shown in the above ease, the treatment is not simple, nor is it always satisfactory. Reduetion without division of the tendo-Aehillis ean hardly be expeeted, and if completed, the maintenance of the bone in the required position would hardly be possible. As a eonsequenee, tenotomy should be performed. Mr. Pollock has shown, in a paper read before the Medieal and Chirurgical Society, that the tendon of the tibialis posticus musele has probably, in those eases, a strong power to prevent the bone passing baek again into its natural site, and advises, in eases of diffieulty, its division. His arguments and facts are strong in favour of the practice; and as no danger ean follow the operation, and as there is every probability of its sueeess, the surgeon may fairly eonsider its adoption as the eorreet praetice.

In an old disseetion diagram in the Guy's Museum of dislocation of the astragalus, this tendon of the posterior tibial musele is plaeed powerfully on the streteh beneath the neek of the bone, and must have had a strong influence in preventing its reduetion.

From my note-book I am able to extraet the following interesting ease of dislocation of the os caleis and foot forwards from the astragalus. I shall give it in the words in whieh it was taken.

Case 85.—H. P—, æt. 23, a polieeman, residing at Woolwieh, upon Deeember 25th, 1845, when on duty, fell into a dry doek. When admitted, two hours after the aeeident, under the eare of the late Mr. Aston Key, the foot presented a depression upon its outer side, above the external malleolus, and mueh swelling below. Upon the inner side a projeetion was felt where the inner malleolus should be, and the foot was mueh lengthened; the eoneavity upon either side of the tibialis anticus tendon was lost, and the outer edge of the sole of the foot inelined a little upwards, and the inner downwards. The ankle-joint was moveable; there was not mueh eeehymosis or effusion, but intense pain; no fraeture eould be deteetcd. Further attempts at reduetion were quite ineffeetual, and the parts were leeehed and poultieed. For four days the patient suffered intense agony, and œdema of the foot and sloughing appeared. Upon Deeember 31st (sixth day) symptoms

of tetanus set in; the sloughing of the integument and astragalus increased, and the tension was relieved by a free incision.

Upon January 1st, the tetanic twitchings had increased, and the patient occasionally uttered piercing shrieks. The sloughing still continued. Amputation was consequently performed and opium freely given. The sloughing, however, of the stump continued, but all the tetanic symptoms immediately disappeared; and upon January 10th the man died from exhaustion. Upon examining the amputated limb the following was observed: In the wound over the instep where the incision had been made, the astragalus projected, black and necrosed. The tendon of the tibialis posticus had slipped out of its groove on to the anterior part of the tibia, and the tendon of the flexor communis digitoram on to the inner surface of the astragalus. The posterior tibial artery and vein were torn through, but the nerve was put violently on the stretch by the projecting astragalus (an interesting point connected with the presence of tetanus and the disappearance of the symptoms after amputation). The ankle-joint was perfect, but the astragalus was dislocated backwards and inwards off the calcis. The tibia and astragalus were so held by the displaced tendons as to render it quite impossible to have reduced them without dividing the tendons.

The next form of dislocation which comes before

us for eonsideration is dislocation of the metatarsus complicated with fraeturc of the tarsal boncs, and I give it in the words of Mr. Cock, 'Guy's Hospital Rcports,' vol. i, ser. 3, p. 281.

Case 86.—"*Dislocation of the metatarsus complicated with fracture of the tarsal bones.*—Benjamin Hoperoft, æt. 22, was admittcd into Cornelius Ward, October 17th, 1854. A remarkably fine, healthy, strong young man, employcd on the Crystal Palaee railway. About an hour previous to his admission, the wheel of a railway waggon, heavily laden with brieks, had passed over his right foot and erushed it. A very thick boot appears to have afforded his foot some protcction, and saved it from entire demolition. There was no wound, but the entire metatarsus appeared to have been separated from its attachment to the euneiform and cuboid bones, and thrown on to the dorsal surface of the instep, where the bases of the metatarsal bones eould be seen and felt projeeting on thc upper and outer surfacc of the foot, and apparently resting ehiefly on thc cuboid bone. There was a dcep indentation on thc inner margin of the foot, eorresponding with the width of the iron wheel whieh had passed ovcr it, and on thc outer margin there was a eorresponding projection produeed by thc displaced metatarsus. Thcre was also somc displacement or fraeturc, or, perhaps, both, of the internal cuneiform and navicular bones. The heaviest erush appearcd to have bccn sustained at this point, and

the integument, although not actually wounded, was evidently much damaged, and the soft parts seriously compromised. The astragalus, calcis, and cuboid, appeared to have escaped injury; and the latter bone could be felt at the sole of the foot, forming there an unnatural projection. The motion of the ankle-joint was free. The effusion and swelling about the foot, and especially around the ankle, were very great, and extended half way up the leg. Blood seemed to be extravasated in considerable quantity. This offered great impediment to an accurate examination, and the precise nature and details of the injury only became apparent at a long subsequent period, when the tumefaction had subsided. Our efforts to reduce the displaced metatarsus were unsuccessful. A great leverage power was obtained by securing the dislocated half of the foot between two pieces of wood, but by no degree of force, employed under the influence of chloroform, could the bones be induced to move. The question of amputation was mooted, but it was finally determined to wait and abide the issue. The limb was placed on a pillow, and kept cold with an evaporating ether lotion. This, in fact, constituted nearly the whole of the treatment. He suffered but little from constitutional irritation, and lay for many weeks with his foot slung in a cradle. The swelling gradually subsided, and revealed more distinctly the prominences and irregularities of the displaced bones. Some ulceration of skin took place over the navicular, but the bone was never actually

exposed, and the wound healed. In February, 1855, he essayed to walk, but until the foot had been carefully strapped up and protected, the attempt was followed by much pain and swelling. Finally, he was furnished with a boot, contrived to fit the abnormal shape of his foot. With this he took his departure, and walked out of the hospital on June 28th. He has since returned to his work as a labourer on the railway."

From the same volume there is also the following case of dislocation of the calcis, navicular, and foot, from the astragalus.

Case 87.—"*Dislocation of the calcis and navicular (consequently of the entire foot) from the astragalus.*—William Hester, æt. 48, was admitted into Accident Ward, April 18th, 1858, a very stout, heavy, muscular man. About half an hour previous to his admission, he was carrying a sack of coals across a plank, which broke in the middle and let him down. The combined weight of his body and the sack appears to have been too much for his right foot, which came to the ground first, and gave way under the pressure. The deformity was very great, from the extreme inversion of the foot. On examination, it appeared that the navicular and the calcis bones were separated from the astragalus, which latter retained its normal position between the malleoli. The round articular head of the astragalus was pro-

jecting prominently under the skin on the outer side. The external malleolus was very prominent, and threatened to pierce the integument. The internal malleolus could neither be seen nor felt, being buried in the deep hollow produced by the displaced calcis and consequent inversion of the foot. The bones were rigid and immovable in their abnormal position. The swelling was moderate, and the pain was very great. He was got under the influence of chloroform. The knee was bent at a right angle, and a towel passed under the ham, and held firmly, while the leg rested on its outer side on an unyielding pillow. I then grasped the instep with one hand, and the heel with the other, and, having first slightly increased the inversion, the reduction of the bone was easily effected by drawing the foot downwards, and at the same time pushing it outwards. An outer splint was then adjusted, and an evaporating lotion applied. He had no untoward symptom, and in a few weeks walked out of the hospital but little the worse from his injury."

Case 88.—The last case which I shall give is one of the left metatarsal bone of the great toe, occurring in a man, æt. 30, who was admitted under the care of Mr. Cock, on June 30th, 1854. The dislocation was produced by a weight falling upon the outer side of the ankle of the left foot, when the man was resting upon the ball of the great toe with his ankle and knee both flexed; as a consequence, the tarsal

extremity of the metatarsal bone was forced inwards. The projecting portion of bone inwards clearly denoted the character of the injury, and reduction was easily accomplished by simple extension. The foot was subsequently strapped up after the immediate effects of the accident had passed away, and the man left well.

There are other dislocations of the tarsal, metatarsal, and phalangeal joints which may occur, but they are accidents of great rarity; and as none have come under my observation, and as the difficulties of each must be met by the application of the same principles which are required in the treatment of other cases, it is not within my purpose to enlarge upon the subject.

THE END.

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